REFRIGERATION

Serving the Industrial Refrigeration and Air Conditioning Industry

1959

Vol. 137, No. 6

Imperial Vacuum Precool... or Air Delivers, Calif. To Six Car Per Hour Output

AFOGUS Zero Regulation Stirs Apprehension In Three Frozen Food Areas

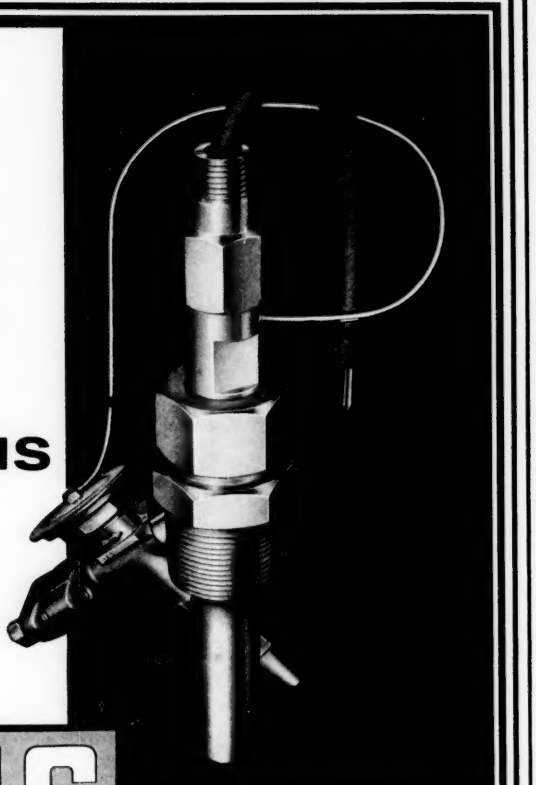
Practical Engineers In Their 50th Anniversary Meet At New Orleans, La.

COVER: Unique Method Of Storing Hoolihart Grapes Successful For Belgians

maintain

CONSTANT LIQUID LEVELS for ALL FLOODED SYSTEMS

with the **SPORLAN LEVEL-MASTER CONTROL**



LMC
LEVEL MASTER CONTROL

Modulated flow action . . . not ON *or* OFF

The LMC is a combination of a standard Sporlan thermostatic expansion valve and a Level-Master Element. The element consists of an insert bulb containing a low wattage heater. It assures a positive liquid level control for all flooded systems.

The LMC feeds with a modulated flow, and maintains a constant liquid level to meet varying load conditions.

The insert bulb controlling the liquid level has no moving parts . . . is not a mechanical float device.

It can be easily and economically installed directly in the shell, accumulator or liquid leg of any coil designed for flooded operation, whether it be a new or converted installation. The bulb must be in direct contact with the refrigerant.

Regardless of application or refrigerant, get Peak Performance on all flooded systems with the Sporlan LMC

For complete details on the Sporlan LMC, ask your Sporlan Wholesaler for Bulletin 60-15.

Our 25th Anniversary . . . 1934-1959

SPORLAN VALVE COMPANY

7525 SUSSEX AVENUE ST. LOUIS 17, MO.

EXPORT DEPT. 85 BROAD STREET NEW YORK 4, N. Y.

"Butcher Boy"

Since 1885

No. 51 AUTOMATIC ELECTRIC DOOR DEFROSTER

(WITH THERMOSTAT)

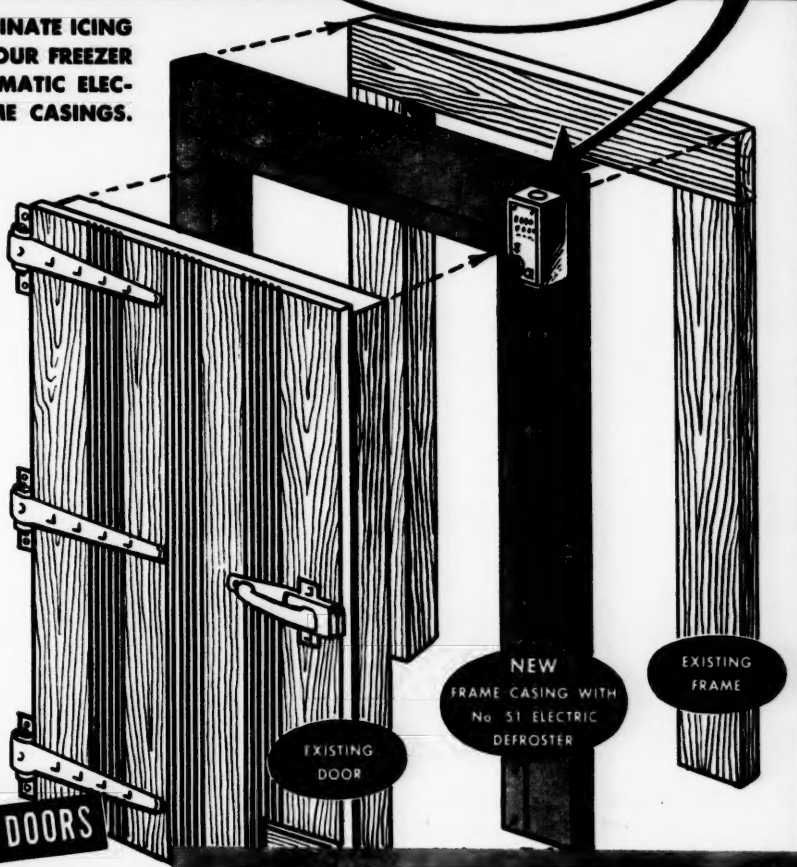
ELIMINATE ICING GASKET CONDITIONS ON YOUR FREEZER DOORS WITH BUTCHER BOY No. 51 AUTOMATIC ELECTRIC DEFROSTERS INSTALLED IN NEW FRAME CASINGS.

Easy to Install

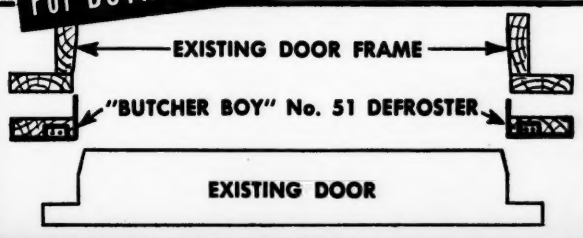
ON YOUR PRESENT DOORS

1. Remove the door and hardware from your present frame.
2. Install factory furnished frame casing with defrosters, to existing frame casing and secure in place with provided fastening devices.
3. Reinstall the door and hardware to new frame casing.
4. Connect to 110 Volt AC line and "Frost Free" door is ready for normal operation.
   Each complete unit is equipped with a "calibrated thermostat control", (adjustable range 60° to 250°F), for economical heat control. Thermostat has "pilot light" as constant guide for "on current" operation — Safety and Security Insurance.

Electrical materials incorporated into Butcher Boy No. 51 Defroster Units are Underwriters Appoved.



For BOTH Infitting and Overlap DOORS



Butcher Boy Refrigerator Door Co.
1000 Butcher Boy Drive, Harvard, Illinois

Please send details and prices for factory furnished frame casings with No. 51 automatic electric defrosters.

For Super Freezer Overlap Doors ☐ _____wide x _____high

For Infitting Freezer Doors ☐ _____wide x _____high

Name _____

Address _____

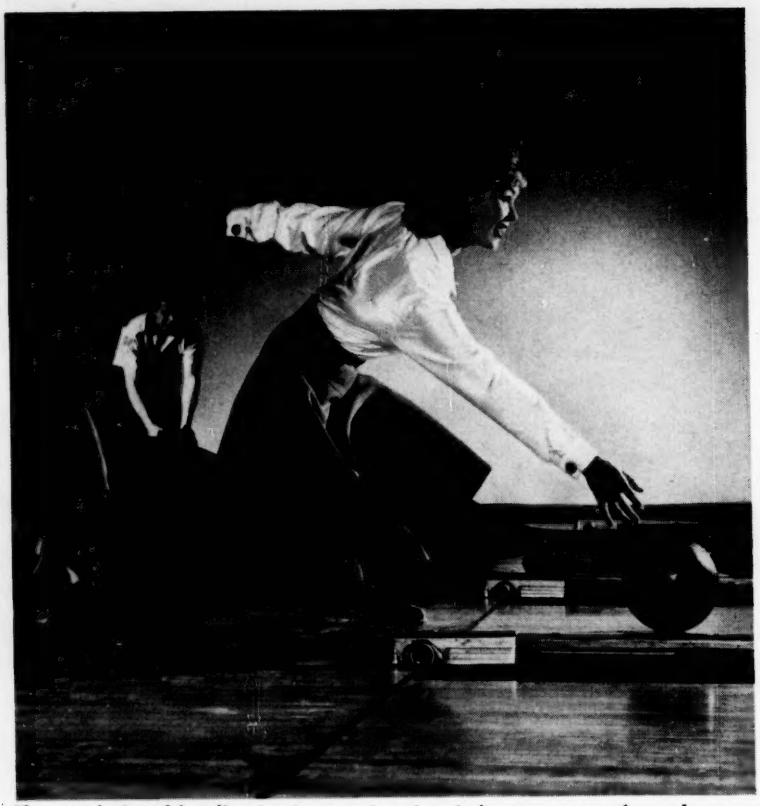
City _____ State _____

In bowling alleys and banks, bakeries and beauty parlors... You'll find

genetron®

SUPER-DRY REFRIGERANTS

Approved! Accepted! Preferred!



The popularity of bowling has increased so sharply in recent years that today more Americans actively participate in bowling than in any other indoor sport. Air-conditioned alleys have made it possible for bowlers to enjoy the game the year round.

In thousands of applications, you'll find "Genetron" refrigerants filling the air-conditioning and refrigeration needs of modern America. "Genetron" refrigerants offer unexcelled purity and dryness . . . and their strict quality specifications are consistently *bettered* in production. Leading equipment manufacturers, refrigeration engineers and air-conditioning and refrigeration wholesalers approve, specify and recommend them. They know they can always count on "Genetrons" for dependable, trouble-free service.

"Genetron" Super-Dry Refrigerants are available from wholesalers everywhere, coast to coast. See your wholesaler. Insist on "Genetron"!

genetron 11 ORANGE LABEL CCl_3F
TRICHLOROMONOFLUOROMETHANE

genetron 12 WHITE LABEL CCl_2F_2
DICHLORODIFLUOROMETHANE

genetron 22 GREEN LABEL $CHClF_2$
MONOCHLORODIFLUOROMETHANE

genetron 113 PURPLE LABEL $C_2Cl_3F_3$
TRICHLOROTRIFLUOROETHANE

genetron 114a BLUE LABEL $C_2Cl_2F_4$
DICHLOROTETRAFLUOROETHANE

Air-conditioning is a "must" inside bank vaults, museum and library storage rooms and other areas where, for security reasons, there are no windows or little air circulation. Precise control of temperature and humidity also protects important records against atmospheric variations.

Modern baking is a highly mechanized operation—far removed from grandma's oven. In this photo, crackers pour from the delivery end of an automated travelling oven. Air-conditioning is used in large commercial bakeries today to control temperature and humidity and for employee comfort.

It gets pretty hot under a hair dryer—even *with* air-conditioning. And the girls like to enjoy having their hair done. That's why so many beauty parlors are so well air-conditioned. It benefits customers . . . employees . . . *and* owners!

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

Allied Chemical

December, 1959

Number 6

Vol. 137

Industrial Refrigeration

Now in its 68th Year of Publication

H. T. McDermott
Editor and Publisher

J. R. Kelahan
Managing Editor

H. D. Busby
Associate Editor

ADVERTISING
O. Rhodius Elofson, *Director*
Edw. Davieson, *Representative*

Helen B. Smith
Secretary

E. P. Swanson
Subscription

V. S. Smith
Production

Official Organ
National Association Practical
Refrigerating Engineers

INDUSTRIAL REFRIGERATION. Vol. 137, No. 6. Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U.S., $2.00 per year; other countries, $3.00. Single copies, 25 cents. Copyright 1959 by Nickerson & Collins Co. Acceptance as controlled circulation publication at Chicago, Ill., and Pontiac, Ill.

CHANGE OF ADDRESS--Notify publisher and your local post office promptly of change of mailing address to avoid non-receipt of copies. Copies incorrectly addressed, because of failure to notify publisher, cannot be replaced. Upon request, post office will provide, without cost, convenient "change of address" mailing cards.

Industrial Refrigeration is indexed regularly by Engineering Index, Inc., and is microfilmed for library use by University Microfilms.

Contents

Enlarged Vacuum Precooler 11

King-sized facilities of 1000-TR are used for two enlarged stationary vacuum cooling tubes at Holtville, Calif. Veg-Vac Precooling, Inc. will open its second season on December 1, with expected precooling rate of six carloads an hour.

Zero Or Below--AFDOUS Code 14

Principal speakers at the National Frozen Food Distributors Association meeting in Chicago in October were motivated by a prominent feature of the AFDOUS Code, zero or below temperatures for frozen foods.

Frozen Foods Handling 18

Two publications recently published have the same title "Protect Frozen Foods From Temperature Damage". USDA pamphlet presents a synopsis on frozen food temperature protection. The TRRF bulletin deals with two methods of checking those temperatures.

Frozen Food Handling Practices 22

Second Regional Educational Seminar for TRRF will be held January 28 and 29 at the LaSalle Hotel, Chicago. Refrigerated warehousemen lead in determination that frozen foods are to receive better handling practices.

Warehouse Features Unattended Plant 24

Operating efficiency at the new Central Warehouse Cold Storage plant in Albany, N.Y., is attained with two-stage, two-step capacity, even though one of the prominent features of the plant is the fact that it is unattended for two-thirds of the day.

NAPRE's 50th Anniversary 30

Papers presented December 9, 10 and 11, at the opening of NAPRE's 50th anniversary year, are summarized.

Departments

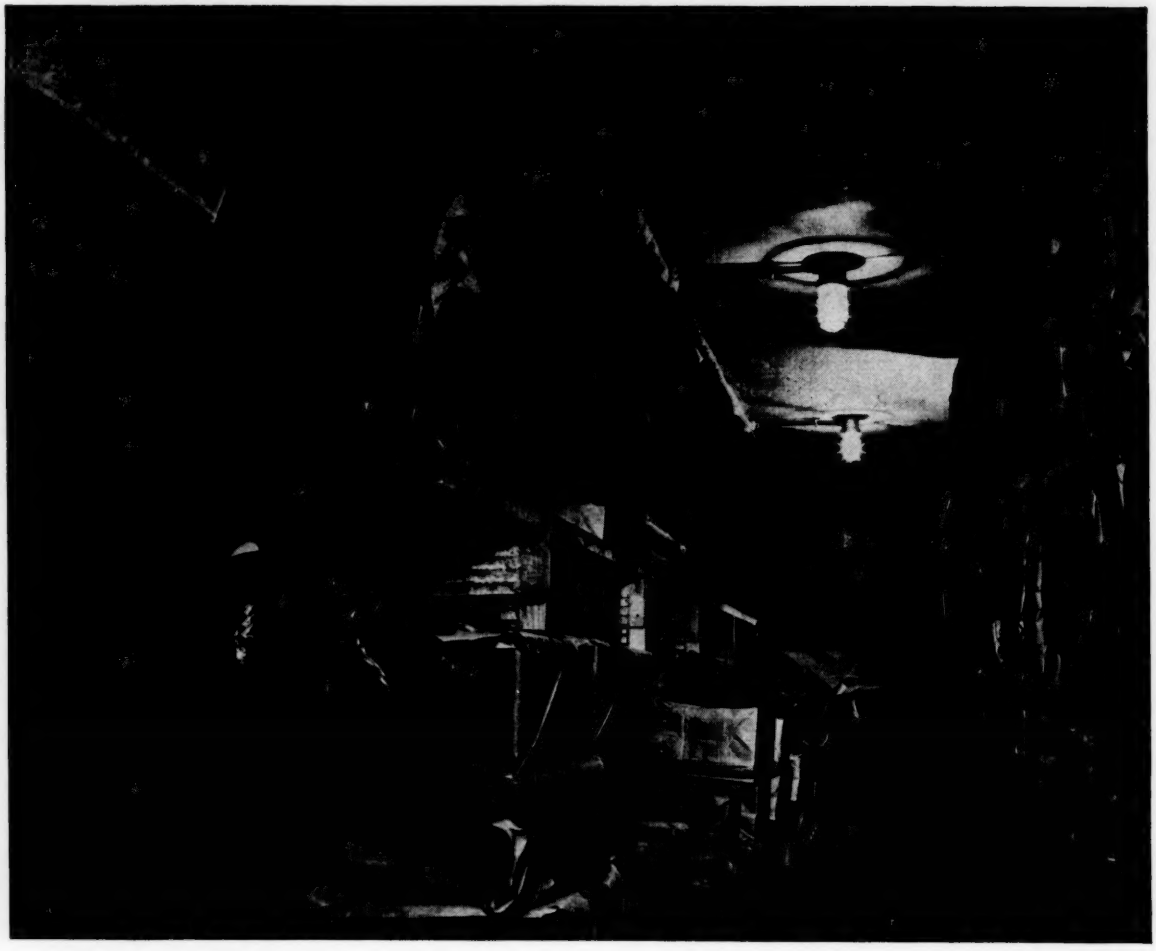
News Briefs	5	Conventions	27
What's New	6	Question Box	28
People Make News	9	Book Reviews	36

COVER: A Grape Preservation Method in Belgium.

Grapes and their preservation by refrigeration have been a subject of a series of tests in Belgium. Pictured on the cover at top is the method of suspending the grapes by their stems from plastic vials arranged in a trough in the storage room. The vials contain various solutions, five of which are reported as most successful in increasing the storage life.

The larger photograph pictures the interior of the room and the 3-coil evaporative surface. Air is recirculated in this metal lined room from between the grates at the foot of the column-like evaporative unit and discharged at the ceiling. Temperatures are said to be maintained within one-half degree of the desired temperature of OC. Relative humidity is said to be retained at 98 percent.

DOW | INSULATION



STYROFOAM®

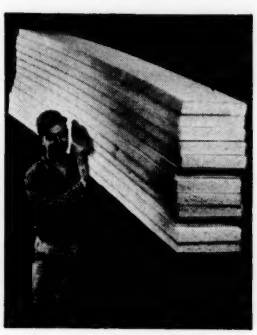
Key to permanently low operating costs

When Styrofoam* insulates low temperature space, the long term costs of operating refrigeration equipment tumble to a new low . . . and stay low, permanently! There's no loss of insulating efficiency with the passage of time, thanks to an unmatched combination of physical properties.

Here's a rigid plastic foam insulation with thousands of tiny, individual air cells in every cubic inch. This cellular structure provides an extremely low "K" factor plus high resistance to the passage of water and water vapor. With Styrofoam there's no water pickup . . . consequently its heat conductivity stays low. And when heat load stays at virtually the same low level over years of service, your equipment operating costs stay uniformly low, too!

And here's another important factor in low operating costs. Because Styrofoam won't freeze, swell or crack — won't permit ice formation, often the cause of buckled insulation—there's no need for periodic replacement and your equipment won't have to work overtime removing heat introduced during repair.

For more information, contact the Styrofoam distributor near you, or write THE DOW CHEMICAL COMPANY, Midland, Mich., Plastics Sales Dept. 2222BU12.

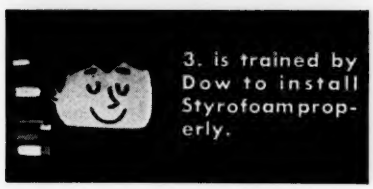


*Dow's registered trademark for its expanded polystyrene

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

SIGN OF AN OUTSTANDING INSULATION CONTRACTOR

Look for this seal when you build cold storage facilities. It's displayed only by contracting firms with a record of top performance in space insulation. This seal means the contractor . . .



For the names of Approved Styrofoam Insulation Contractors in your area, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 2222BU12.

STYROFOAM®

STYROFOAM is Dow's registered trademark for its expanded polystyrene

DOW

news briefs—

Bitterness In Carrots Traced To Apple Storages

▶▶▶ CHEMICAL CHANGES which produce bitterness in carrots has been traced to gas action of apples held in the same storage. Experiments were conducted in commercial refrigerated warehouses in 1956, '57 and '58 by a team of Cornell University Scientists at the New York State Agricultural Experiment Station. They concluded that the bitterness which occurs during storage is due to an abnormal metabolism which is probably caused by ethylene gas or a closely related compound given off by apples.

The New York State Association of Refrigerated Warehouses, The Refrigeration Research Foundation, the New York State Canners and Freezers Association, Inc., Beech-Nut Life Savers, Inc., all gave financial assistance to this project in a contract of the State University of New York. A research project report is available from the Experiment Station at Geneva, N.Y.

Soviet Russia Has Largest Whale Factory

▶▶▶ SOVIETSKAYA UKRAINA recently entered service in the Soviet Union merchant fleet, the NEW YORK TIMES reported in mid-November. With a displacement of 44,000 tons, it was designed to handle 65 whales a day or up to 4,000 a season. These factors plus the vessel's dimensions, make it the world's largest whale factory. The ship's refrigerated holds have a capacity of 2000 tons. All cabins have air conditioning.

Another Ice Market In Cherry Shipments

▶▶▶ COLD WATER, by reducing respiratory activity of red sour cherries, keeps scald (bruising discoloration) to a minimum. USDA's Agricultural Research Service in a recent pamphlet reports that the water should be 55 to 60 F. If water at that temperature is not available, or if holding time exceeds two hours, ice can be added. Research shows shipment of freshly harvested cherries to processors in water tanks instead of lugs, prevents scald.

First Fresh Water Test Reported Successful

▶▶▶ DESALTING ocean water by a freeze method in order to produce fresh water, has been reported as successful at Syracuse, New York, by the ASSOCIATED PRESS. First public test of the pilot plant designed to produce fresh water at the rate of 15,000 gal per day was successful, officials of Carrier Corp. said. A Federal contract with the pilot project is one of several by the Interior Department in a quest to find a cheap and efficient method of converting seawater.

Million Dollar Plant For Pillsbury Los Angeles

▶▶▶ PILLSBURY CO. announced late in November that it will construct a $1 million dollar facility in East Los Angeles. A refrigerated foods plant will be one of the principal facilities, which also includes a grain elevator, warehouse and new Los Angeles offices. Other Los Angeles facilities include a grocery and bakery-mix products plant and a refrigerated distribution warehouse. Pillsbury has similar facilities at Sacramento, Calif., Ogden, Utah, Astoria, Oregon, Calgary, Saskatchewan, Enid, Oklahoma, Atchison, Kansas, Minneapolis, Minnesota, Springfield, Illinois, Louisville, Kentucky, Buffalo, New York, and Midland, Ontario.

Separate Postage Stamps In Low Temperature Storage

▶▶▶ FLATBUSH MAGAZINE recently reported on a test conducted by the Brooklyn Postmaster. Humidity had caused sheets of postage stamps to adhere to one another. To separate the stamps stuck together the Brooklyn Postoffice now places the stamps in a freezer compartment of a refrigerator for a 3-hour period. Stamps are then withdrawn from the freezer, the sheets separate easily and retain their adhesive quality.

What's New

MACHINERY
APPLIANCES • PROCESSES

DESIGNS AND IMPROVEMENTS IN WIDE VARIETY

THERE HAS BEEN no let up in new and improved and more efficient machinery, accessories and supplies introduced for the refrigerating and air conditioning field. With the prolonged steel strike, there was a supposition that some of these developments would nosedive slightly, but that hasn't come about.

This month the rotary line introduced by Vilter, is described in greater detail, a new motor is introduced and some thought given to pulleys and adjustable motor bases. The transportation industry has a new refrigeration drive available. Egg coolers and *air walls* also made new equipment news.

All Aluminum Cooling Tower

ONE OF THE FIRST all aluminum cooling towers in the industry, designed and delivered by Foster Wheeler for Kaiser Aluminum & Chemical Corp's plant at Ravenswood, West Virginia, began operation approximately one year ago as one of two cooling tower installations at that plant. The other tower was a standard component wooden cooling tower of the same design and capacity.

Operation performance data indicates that the aluminum tower has fulfilled the expected operation requirements. The side-by-side installation makes it possible to evaluate construction costs for the two types. On towers of same design and location, the installation of an all aluminum structure would require 40 to 60 percent greater expenditure than a wooden structure based upon a delivered and erected installation.

The difference can be decreased if wooden spray eliminators and fill racks are used in place of the all aluminum construction. Economic practicality of the all aluminum structural design may be justified where thorough control of water conditions is available. Otherwise for the present, appearance and low maintenance would be the prime importance for using an all aluminum construction.

Construction Details

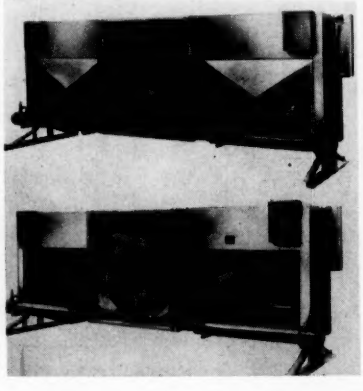
Tower components fabricated of aluminum include the casing, distribution piping, drift eliminators, eliminator supports, fan, fan cylinder, fill, fill supports, hardware and fasteners, inlet louvres, mechanical equipment supports, partitions, stairway and structural members. Non-aluminum components include *Bakelite* spray nozzles, fan drive motor, speed reducer and drive shaft assembly.

The final all-aluminum structural design is unique in that the working portions of the tower, namely fill, distribution system, spray eliminators and mechanical equipment are all supported from the roof beams. This arrangement permits wider column spacing while still retaining easy-to-handle 4 x 4-ft fill racks, supported on close horizontal centers.

The hanging of the fill racks also simplifies maintenance, testing of alternate materials or fill configurations, and makes it possible to increase cooling tower performance in the future. All fill racks can be lowered simultaneously into the basin by lowering the top fill rack using block and tackle. Total weight of one column of aluminum fill racks is only 90 lbs and can be handled conveniently by one man.

Conditioning High Side

AVAILABILITY of its Unicon-Compressor, a complete air conditioning high side for outdoor installation, was announced in October by the Kramer Trenton Co. Fully protected from the weather it can be readily installed

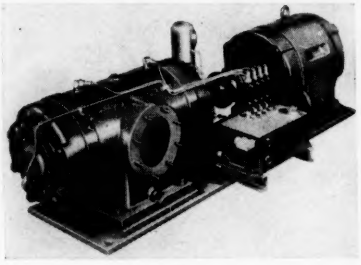


on the roof, ground or location where there is an ample supply of air for this air condensing unit. Said to be unusually quiet, the Unicon-Compressor with low silhouette and aluminum casing, can be attractively blended in any architectural treatment. The unit can be furnished with *Winterstat* to control receiver pressure and assure operation at any time of the year.

Vilter Rotary Boosters

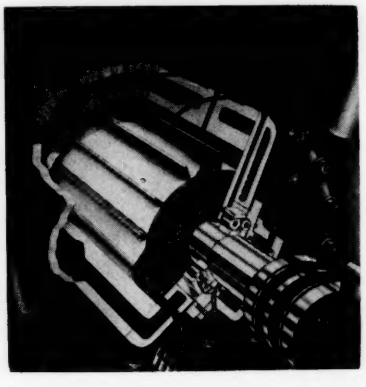
INTRODUCED in August as an addition to their line of refrigeration and air conditioning equipment, was a series of rotary booster compressors by the Vilter Manufacturing Co., Milwaukee. For use with ammonia, Refrigerant 12 and Refrigerant 22, the rotary is designed for low temperature applications and will readily fit into multi-stage systems as the first or booster stage.

Ranging in capacity from 4 through 400-TR, the VRB features high efficiency, compactness, flexibility of application and ease of maintenance. Of the sliding

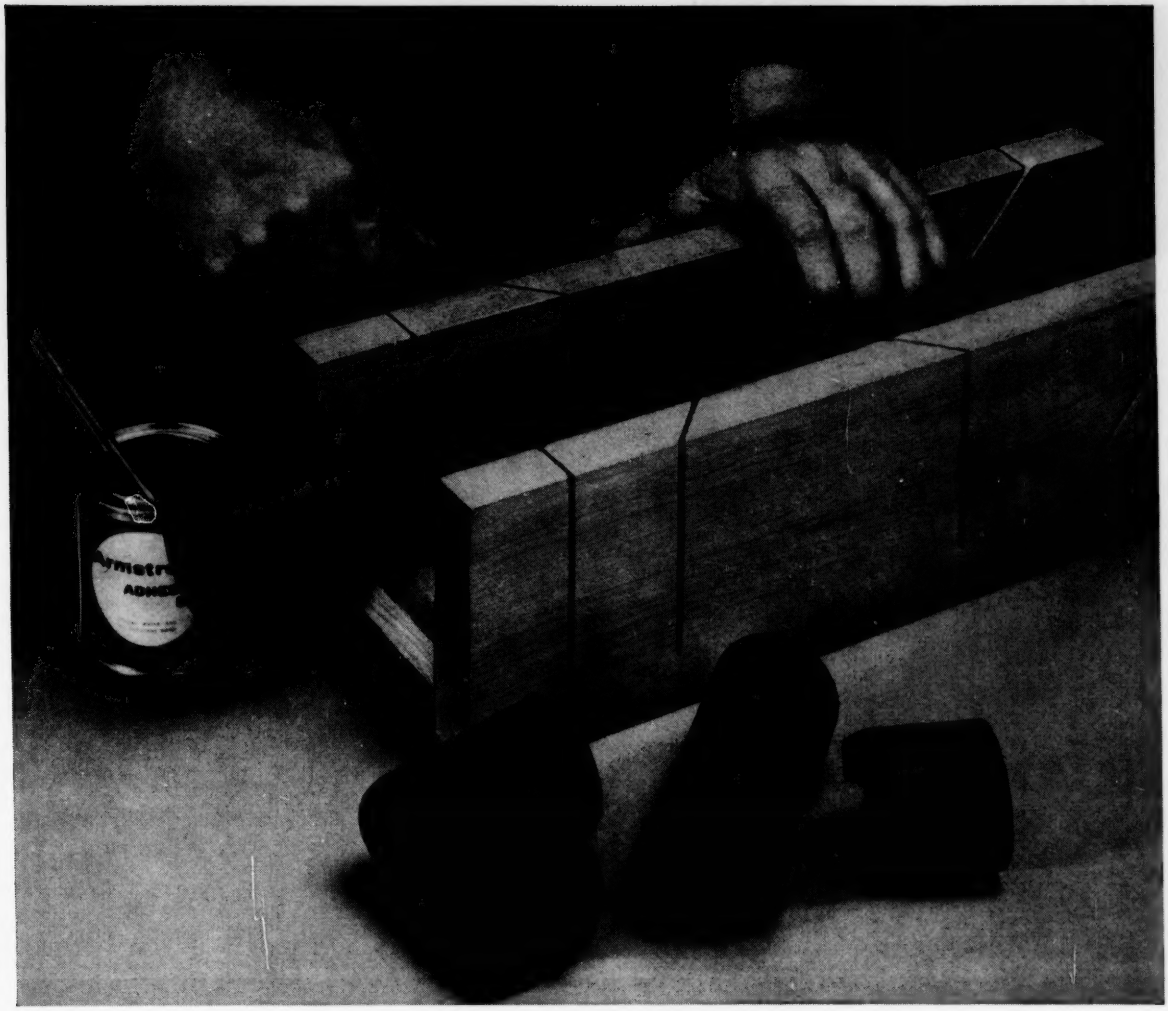


vane type, the VRB is internally lubricated by means of a mechanically driven force feed lubricator.

Differing from other rotary compressors primarily in the seal and oil dome arrangement, the Vilter machine em-

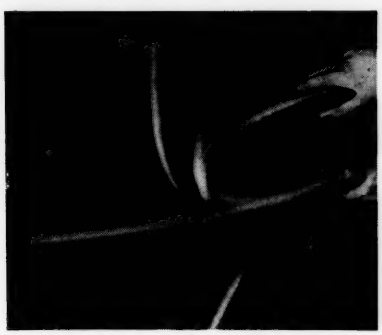


ploys a double bellows type seal and an oil reservoir with sight glass to keep the seal flooded at all times. Consisting of two opposed seals, one sealing to the atmosphere and the other to the cylinder, both are lubricated and cooled by circulated oil. Oil is moved through the seal chamber and back to the dome by thermal-syphon effect. The oil dome is equipped with attachment for easy charging with a Vilter oil charger.



A miter box and a sharp knife are all that are needed to fabricate fitting covers fast with Armaflex.

Insulate fittings 50% faster with Armstrong Armaflex Pipe Covering



Armaflex is extremely flexible, readily follows contours of pipes or bent tubing without special cutting and fitting.

The time it takes to insulate pipe fittings properly can drop 50% or more when Armstrong Armaflex is used. Armaflex is the new, cellular, flexible foamed plastic insulation that is completely waterproof and vaporproof. There's no waste, and it doesn't chip, crumble, or rub off.

To make fitting covers, the material is cut quickly and accurately with a sharp knife. The pieces then are cemented together with Armstrong 520 Adhesive, slit lengthwise, and snapped in place. Since Armaflex is the same vaporproof material that insulates the pipe run, there's no need to buy wrap-on coverings, cements, twine, tape, or waterproof coatings. One insulation does all the work.

An Armaflex job is more than just fast. Fittings look neater, too. And the installation lasts indefinitely. Armaflex stays dry and efficient — will positively stop condensation when used in recommended thicknesses.

For full information on this remarkable pipe covering and complete instructions on how to apply it, write today to Armstrong Cork Company, 2212 Skye Drive, Lancaster, Pennsylvania.

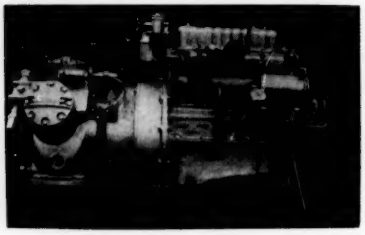
Armstrong INSULATIONS

What's New

From Towers To Pipe Racks — With Compressors And Insulation —

Transport Refrigeration

▶▶MUCH PUBLICIZED abroad, and receiving considerable attention in the U. S. is the new light weight Perkins diesel engine. Developed and manufactured in England, the unit is being marketed by Transicold Corp. Model 230 is described as a standard 7½-ton unit.



It is a 4-cylinder water-cooled machine of 22-hp operating on diesel fuel and drives a 3-cylinder refrigerant compressor at 1800 rpm. Operating records show an average fuel consumption of .4 gph with the unit operating constantly. Two-speed operation is controlled by cargo-hold temperature. For gasoline or LPG fuel the firm also offers a 7½ TR unit of 31 hp.

Egg Storages Develop

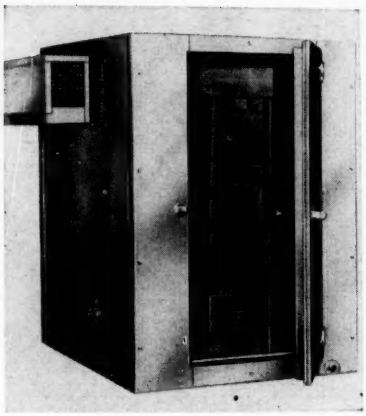
▶▶COMMON PROBLEM of most egg producers is low quality and low hatchability. Despite a high demand for eggs of both types, many producers find themselves at a marketing disadvantage because of the short term keeping quality. Complete facilities for handling both hatching and market eggs to preserve their new-laid quality, must include a refrigerated holding room.

Tests have demonstrated that if AA or A Grade Eggs are held at 60 degrees F for two weeks, only two percent of these eggs will be downgraded, but if these same quality eggs are held at 70°F., about 95% will be downgraded. Additional research work show that at 85 degrees F, a Grade AA egg will drop to Grade C in 48 hours, whereas if this egg were held at 60 degrees F, it will remain Grade AA for over six days. Also, since eggs begin embryonic development at about 70 F, it is equally important to hold hatching eggs below this temperature.

In addition to proper temperature a high level of humidity prevents loss of moisture from eggs. Moisture loss causes eggs to weigh less as the egg loses water and the contents shrink. The air cell then becomes larger and the eggs are downgraded.

Independent research studies by Universities and Agricultural Extension Services, USDA, have shown exactly the requirements which must be engineered into egg storages for relative humidity of 70% or higher, and a temperature of 55 F.

Victor Egg Cooler



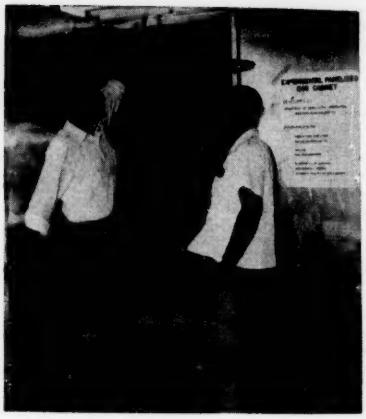
▶FOUR SIZES of high humidity self-contained prefabricated walk-in refrigerators for cooling and storing eggs, have been introduced by Victor Products Corp., Hagerstown, Md. All models have self-contained refrigeration systems, Weather and rust resistant galvanized steel interiors are used with satin aluminum finish on the exterior. These walk-ins are equipped with plug type door.

Univ. of Massachusetts Develops Egg Cooler

▶PREFABRICATED, an egg cooler designed to store 1200 dozen at a 30 percent space saving, has been developed by J. T. Clayton, Associate Professor of Agricultural Engineering, Univ. of Mass. Cabinet-like, this cooler is 7x10x7-ft with three 3x7-ft doors across the front. The cabinet is made from 3-in. thick panels having expanded plastic cores and .025-in. aluminum covering.

Requiring only 70 sq. ft., the cooler weighs 350 lbs. and requires less than 90 cu. ft. of shipping space. Each door weighs 38 lbs. Similar storages take approximately 100 sq. ft.

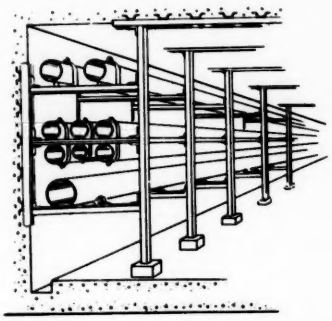
The Clayton cooler uses ½ h.p. refrigeration unit which maintains a constant temperature of 55 F. Inside the



egg cases are stacked 4 high, 8 rows across. Three men can assemble the cooler in two hours, including placing the refrigeration unit in working order.

Erection Set Pipe Racks

▶NEW FAMET Metal Framing, recently announced by the Fee & Mason Mfg. Co., features wide application possibilities and installation ease. Tunnel pipe rack shown is one of many applications to facilitate quick, economical erection of lightweight piping suspension. Other applications include, temporary piping system suspension; extensions to present piping systems; storage racks and bins; floor mounted suspension systems, etc.



Famet installs quickly without the use of special tools. It can be easily cut to desired length with ordinary hacksaw. Cross members are quickly attached to vertical channel with specially designed locking nuts, positioned by hand, to which are affixed desired *Famet* fittings, joining cross and vertical members. Entire assembly is locked by tightening nut with open end wrench.

Terminating Condensation

▶▶CONDENSATION caused three major headaches for Firestone Tire & Rubber Co. in Akron. Chilled water lines leading from a refrigeration unit

(Continued on Page 37)

REFRIGERATING PEOPLE IN THE NEWS

Manufacturing Changes And Appointments

New Plant For Ball Valve Co. in Kansas

ACCOMMODATING its rapid expansion, the Ball Valve Company has purchased a larger building in Neodesha, Kansas. This represents a third move for the company since it was founded in 1956. Each move has been necessitated by need for enlarged facilities. Neodesha provides air, rail and truck terminals which company spokesman indicated means speedier delivery and less freight costs for all customers.

Manufacturers of the newest innovation in compressor valves, the firm is headed by **Van J. Sparks**. With refrigeration and related industries for over 34 years, Sparks developed the ball valve with the thought of eliminating customer time and money losses due to compressor failures. Although from personal experience he had long been of the opinion that valves were the weakest part of many compressors, it wasn't until a large insurance company published a report on compressor failures that Sparks set about a valve development in earnest.

This insurance company estimated that one-third of compressor failures were due to valve breakage. The new Ball Valve building has been completely renovated to make it a model of decor and effciency. It was formerly owned by Harry H. Woodring, former Governor of Kansas and Secretary of War in the late F. D. Roosevelt's second administration. Engineer for the Ball Valve Company is Burt Owsley.

Danfoss In Canada

DANFOSS Manufacturing Co. of Nordborg, Denmark, has acquired a 4-acre site in Toronto Township, Canada, where they are erecting a plant and office building scheduled for completion in February 1960. Operations in Canada will be a company of the same name operating as a subsidiary of the Danish parent. Manager of the Canada plant is **B. T. Nielson.** The company has had a sales office in Toronto for seven years and will now start manufacture of automatic equipment for heating, refrigeration and electric industries, including thermostatic control valves, according to the FINANCIAL POST.

Frick Directors Announced

NEW OWNERS of the Frick Company met late in October at Waynesboro. **Howard Butcher, III,** president of General Waterworks Corp. which now owns the refrigeration firm and operates it as a subsidiary, told the public press that the company will continue operations under the same name and with much the same staff. However, he said Frick Company would be expanded to fill an even more important role in local and national industry.

Seabrook Chairman

New chairman of the board of the Frick Company is **John M. Seabrook,** until recently, president of Seabrook Farms, Inc. As announced previously, **W. H. Aubrey** is president of the Frick Company, **A. E. Roschli,** vice-president and treasurer, **M. W. Garland,** vice-president for engineering and **M. B. Watts,** secretary. **Howard Butcher** and **W. W. Keen Butcher,** plus the company officers, make up the board of directors.

Eutectic Plate Maker

FORMED RECENTLY is a new firm, McKenzie Portable Refrigeration, Ltd., at Middleton, Nova Scotia. It is headed by **Alex McKenzie,** president of McKenzie's Cold Storage Co., a distributor of frozen foods, and dairy products.

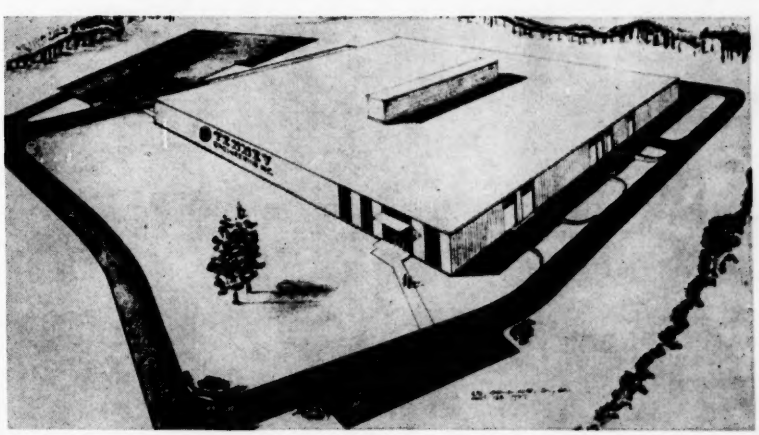
The plant will manufacture eutectic plates 24x15x2-⅝-in., which use a eutectic solution described as being jelly-like in substance. The plates are produced for low temperature transportation equipment, primarily trucks.

Other Nova Scotia business men on the board for the new company are **F. M. Covert,** Q.C., **Allan Foulis** of Halifax, **John J. Jodrey** of Hantsport; **Andrew Eisenhauer** of Lunenburg, according to FINANCIAL POST, Toronto.

Tenney Engineering Plant

NEARING completion at Wilmington, N. C. is the new plant for the transfer division of Tenney Engineering, Inc. A leading manufacturer in environmental test chambers, and heating and air conditioning and refrigeration components, Tenney has expanded its line of refrigeration coils. According to **Sid Sharpiro,** sales manager, the firm will ship from the new plant from the first of the year 1960.

The new building is completely air conditioned. It is a one-story construction of pre-stressed concrete roof and walls which will permit the addition of seven production lines. The company's headquarters and environmental division are in Union, N. J. The heat transfer division also has a plant in Baltimore.



United In Canada Also

UNITED ELECTRIC Controls Co., Watertown, Mass., manufacturers of temperature, pressure and vacuum controls, has announced the establishment of a manufacturing facility in Canada. The new firm, whose name is United Electric Controls (Canada) Ltd. is located in Dorval, Quebec. **Lorne J. Inglis** has been appointed General Manager. United Electric's products are used throughout the world in a great variety of marine, industrial, aircraft and special purpose applications, such as space heating, ovens, and refrigeration.

California Refrigerator Acquired by Recold

RECOLD Museum of Refrigeration and Air Conditioning has acquired a California No-Ice Refrigerator, one of the first attempts at eliminating the need for ice in domestic applications. It was donated to Recold by **E. J. "Red" Sherwood** of El Paso, Texas. Patented in 1911, this refrigerator operates on the principle of evaporation.

Asbestos provides the surface from which the evaporation takes place. The manufacturer apparently thought that only in California, Nevada and Arizona was the humidity low enough to make the refrigerator operative. The name plate limited usage to those three states. The No-Ice Refrigerator is still in operating condition.

Reese Represents Recold

RECOLD Corporation has named Reese Associates, Minneapolis, as representative for air conditioning products in Minnesota, Eastern Dakotas and Northwestern Wisconsin. The announcement came from **Harry L. Quinn**, Recold's Eastern Sales Manager. **Phillip R. Reese** founded the firm more than 40 years ago. **E. L. Kuderling** serves as president, **Theodore C. Gianos**, vice-president, and **M. F. Siegfried**, secretary-treasurer of the firm.

York Mobile Appointment

FIVE Manufacturer's representatives have been appointed by the York Division, Borg-Warner Corp. to handle products in the original equipment manufacture and in the mobile refrigeration fields. District representatives are **Frank Hawk**, N.Y.C., serving the Northeastern states; **Richard Morrow**, Decatur, Ga., Southeastern states; **Clyde Webb** Company, Fort Worth, Southwest; **William McCullogh**, Chicago, Central states, and **O. J. Kesti**, Detroit, North Central states. Included in the new sales program will be condensing units for original equipment manufacture and truck refrigeration systems.

Baltimore Aircoil Host To ASHRAE

OPEN HOUSE for ASHRAE's Region 3 was held at the Baltimore Aircoil Co. on October 21. With the factory in full operation, 150 members were given an hour long guided tour. Among the guests were ASHRAE President, **Arthur Hess** and Mrs. Hess, **D. D. Wile**, 1st vice-president of ASHRAE and vice president for engineering of Recold Corp. and **Cecil Boling**, past president of ASHRAE and president of Dunham-Bush, Inc.

Highlights of the plant tour included coil bending and testing, forming of cooling tower wet-deck surface, and inspection of a new 500-ton press. A banquet followed the B.A.C. open house at nearby Friendship International Airport. Introduced by **Yeardley Smith**, president of ASHRAE's Baltimore chapter, the speakers at the banquet were Arthur Hess who discussed meaning of the word "Engineer" and **Robert Dietrich** who spoke on Baltimore city building inspection.

Ammonia Appointments

NITROGEN Division of Allied Chemical Corp. announced recently the appointment of Eton-Colby Chemical Co., Columbus, Ohio, as anhydrous ammonia agent throughout central Ohio. Adirondack Chemical Co., Plattsburg, N. Y., was designated ammonia distributor for the Northeastern part of New York state. Salt Service, Inc., of Philadelphia, Penna., was appointed agent for the Philadelphia area.

Silicone Potting Compound

DIELECTRIC GEL is the name of the new silicone potting material developed by the Dow Corning Corp. This material which initially pours and gels into a crystal clear self-healing material to form a resilient protective mass for electronic components and circuits. Outstanding dielectric properties and moisture resistance are exhibited by the material from minus 76 F to 392 F.

A brochure pictures how easily potted circuits for conventional electronic electric junction boxes can be traced visually, and how test probes are accurately directed to connections by simply inserting them through the gel.

Armstrong Appointments

WELL KNOWN authority on vinyl-type polymers, **Dr. Calvin E. Schildknecht**, has been retained by Armstrong Cork Co. as consultant, it was announced in October by **F. B. Menger**, Director of Research. Dr. Schildknecht is chairman of Chemistry Department, Gettsburg College. In addition to teaching positions, Dr. Schildknecht has been an industrial consultant in plastics, fibers, synthetic rubber, paint and adhesives.

D. E. Sanderson

Swiss Subsidiary

FORMATION of a Swiss Corp. as a wholly-owned subsidiary of Armstrong Cork Co. was announced also by **I. Wayne Keller** of Armstrong International Operations. The new subsidiary, Armstrong Cork International, S.A., have offices in Geneva. **D. E. Sanderson**, formerly of the company's Spanish subsidiary, has been named president and general manager, as well as director of the new company. Other directors are **H. P. Brechbuhl** and **H. Huguenin** of Geneva. General Sales Manager will be **Stewart C. Dalrymple.**

Al Lusch Insulations

ANNOUNCED early in the last quarter of 1959 was the formation of a new cold storage insulation corporation, Albert F. Lusch Insulations. Reilly-Benton Company has withdrawn from the cold storage field and **Albert F. Lusch**, formerly general manager of that firm has withdrawn from the Reilly-Benton organization. Albert F. Lusch Insulations took over several contracts held by the predecessor firm and is actively in operation under the new name. The Reilly-Benton Company, Inc., will continue in other insulating fields.

New Vinyl Insulation

DEVELOPMENT of a new vinyl electrical insulation sleeving called *Resinite EP-93C* was announced by the chemical division of a large U. S. dairy company. The new vinyl insulation possesses low temperature flexibility to minus 95 F, complete resistance to fungus and corrosion and is self-extinguishing in 1 to 5 seconds depending on tubing size. The dielectric strength is rated at 250 to 340 volts per mil of wall thickness. The new product is colorless, transparent, sleeving available in sizes from #24 a.w.g. up to 2½ in. i.d. Test samples, test results and data sheets are available.

Enlarged Vacuum Pre-cooler Takes King Sized Refrigeration

By THOMAS A. DICKINSON

▶▶▶TWO STATIONARY vacuum refrigeration tubes, said to be the largest in current operation, are making it possible to use the *Vac-U-Pak* process in chilling an entire carload of produce during each of their respective operational cycles at Holtville (Calif.) Veg-Vac Precooling, Inc.

The latter is a seven year old commercial cooling firm owned by Holtville Ice Company and a number of associated produce shippers. It presently serves growers within a ten-mile radius of Holtville.

Most of the produce now processed by Veg-Vac is grower-packed lettuce, romaine, and cabbage. In the Holtville area, they harvested from December 1 to April 1. However, company officials are hopeful that their king-sized vacuum cooling tubes will make it economically feasible for growers of many other crops to take advantage of the *Vac-U-Pak* process —in which event, the firm should hereafter be able to maintain the tubes in operation during many more months of each year.

Bacteria Retarded

The *Vac-U-Pak* process is a high-speed method of refrigerating produce in an almost-perfect vacuum (in a compartment in which pressure has been reduced to less than 29-in., mercury) so as to decimate many of the minute forms of life that cause fruits and vegetables to decay. Refrigeration under ordinary atmospheric pressures could not be done with comparable speed, and would enable most microbes to hibernate.

By temporarily creating an environment which is unfavorable to the existence of the natural enemies of produce, its developers claim *Vac-U-Paking* in effect sterilizes fruits and vegetables to the point where they can be stored for long periods without severe refrigeration, and greatly increases shelf life following a cold-storage interval. The process is in some instances reducing losses due to spoilage by margins of more than 90 percent.

Six Carloads An Hour

With its present cooling tubes in constant operation, Veg-Vac can now process six to eight carloads of produce hourly for little more than what it once cost to chill much smaller quantities of vegetables. In this connection, the firm's vacuum cooling capacity is an item of great importance because—in addition to saving money—it enables the company to minimize spoilage by precooling incoming produce within four or five hours after it has been picked.

To obtain its present vacuum cooling facilities, Veg-Vac had two older and more conventional tubes lengthened so as to double their capacities.

Equipment Added

The enlarging job was handled by Gay Engineering Corp., Los Angeles, and involved:

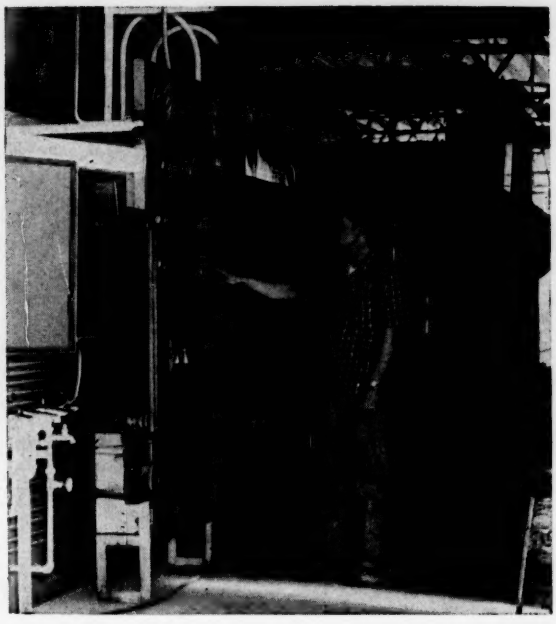
(a) The addition of steel structural members needed to make two 82-ft. long vacuum chambers.

(b) The installation of two electrically-powered Fuller high-speed rotary vacuum pumps to supplement a pair of Beech-Russ evacuation units which were already available.

(c) The incorporation of two 82-ft *Conveyco* twin conveyors in the tubes. Powered by 7½-hp. motors, the latter conveyors are used in conjunction with four external *Conveyco* units to automate the process of loading and unloading the tubes.

(d) The addition of facilities which now permit use of Holtville Ice Company's 1000-TR capacity in the reduction of temperatures within the evacuated tubes to 33F.

In the removal of incoming produce from trucks, Veg-Vac uses five fork lifts—two with 10,000-lb. capacities, one with a 5000-lb. capacity, and two with 4000-lb capacities. Because the produce is palletized, the respective capacities of the fork lifts make it possible to completely unload any given truck in only one operation.



Above—One lengthened tube discharges its precooled batch while other works on cooling second load. Right—Plant engineer checks vacuum readings on controller-gauge panel from which processes are regulated. Below—Four retired reefer cars still return to work when peaks overtake arrival of transportation.

Mechanized Handling

Palletized produce, thus removed from a truck, is taken by a fork lift to a *Conveyco* input conveyor for the vacuum cooling tube which will be used to process the load. If the tube is in use, the produce is carried only to a point whence it can most rapidly enter the vacuum chamber when the latter is being emptied.

When fully loaded, the tube's elevated access doors are automatically lowered and sealed. Then, in a matter of minutes, pumps produce a high vacuum in the closed compartment so that refrigeration facilities can be utilized.

Tube doors are unsealed and raised when the temperature of a load in process has been reduced to 33 F., after which the vacuum chamber can be reloaded (as quickly as chilled produce is conveyed out through its exit) at 120 fpm.

Conveyors beyond each tube's exit are arranged in such a manner that processed (and still palletized) vegetables may go directly to (1) a refrigerated truck at a nearby loading ramp, (2) a refrigerator car on a 14-car railroad spur, or (3) one of four cold-storage rooms maintained by Veg-Vac for produce which cannot be shipped immediately.

Solo Operation

Automation of Veg-Vac's vacuum cooling facilities is such that one man (using pushbuttons) can provide all the human effort needed to handle and process produce from the time it is fork-lifted onto an input conveyor, to the time it reaches a shipment or storage station. Consequently, labor is employed by the company for the principal purpose of maintaining equipment, operating fork lifts, and handling paperwork.

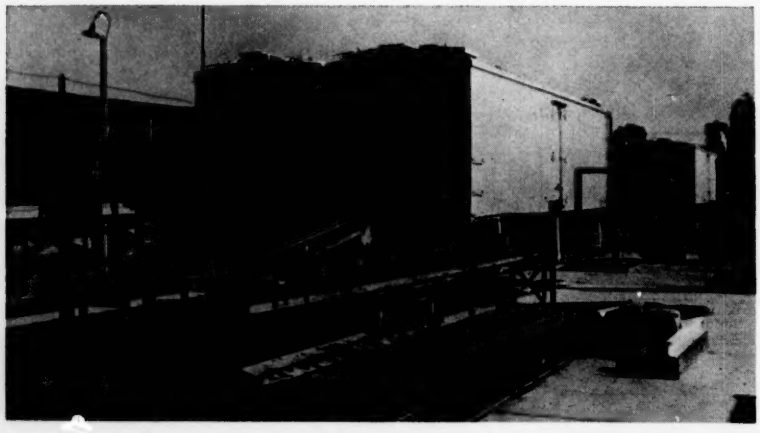
In the event of failure of some automatically-controlled mechanism or in a control system itself, no damage is likely because work will be halted automatically until repairs can be made—thanks to electronic equipment which literally makes it possible to monitor and fail safe a safety device.

New Hydro-Cool Plants For Florida Citrus

▶▶THREE FLORIDA Citrus Exchange packing houses have begun their 1959-60 season in September with hydro-cooling process equipment. According to a publication of the Florida Citrus Exchange, a large majority of all houses in the exchange system have improved their facilities for shipping fresh citrus fruit. Preliminary forecasts indicate the coming season will see a definite trend toward an increase in fresh fruit sales from Florida.

Season Preparations

Mims Citrus Growers Association packing house, which installed hydro-cooling equipment prior to last season has completed modifications which are expected to boost the plant's hydro-cooled bagged capacity by as much as 25 percent. Brooksville CGA is in the process of adding hydro-cooling machinery at its packing house, and will have completed the installation prior to the shipping season in that area. Alcoma Packing Co. at Lake Wales will open what they describe as "the most advanced fresh fruit house in the world", which includes hydro-cooling facilities.



Indianans Head Meat Institute

▶▶MEETING AT Chicago late in September, the American Meat Institute elected three Hoosiers to the top offices in the Institute. Homer R. Davison, Valparaiso, was re-elected president of this national association of meat packing firms, at its 54th annual meeting. George W. Stark, Indianapolis, was re-elected chairman of the Institute's board of directors, and A. P. Davies, also of Valparaiso was elected to a newly created vice-presidency.

Vice-chairmen of the Institute's board who were re-elected are W. A. Barnette, Sr., Greenwood, S. C., A. W. Brickman, Chicago, Wesley Hardenbergh, Lake Zurich, Illinois, H. B. Huntington, Newark, Ohio, John F. Krey, St. Louis, Cornelius C. Noble, Madera, Calif., and Hugo Slotkin, Detroit.

Other officers re-elected include Vice-president George M. Lewis, and Secretary-Assistant Treasurer, Roy Stone, both of Chicago; and Treasurer H. Harold Meyer, Cincinnati.

Mechanical Cooling Of Hatching Eggs

▶▶LITTLE DIFFERENCE in the hatching of eggs was obtained when they were held at either 45, 55 or 65 F for periods up to seven days, stated a recent report on research of Texas A & M College. The study had been undertaken to determine the effect of mechanical cooling on varying temperatures and humidity conditions on the hatchability of chicken eggs.

Eggs held in a refrigerated room (45F) hatched one percent better than eggs stored in rooms cooled with either an evaporative cooler (65F) or air conditioner (55F), *but up to 12 percent better than eggs held at room temperature*. On the other hand, eggs held at 86 to 89 percent Relative Humidity hatched only one percent better than eggs held at 43 to 50 percent RH. It was noted that for each day the eggs remained in the coolers there was an average daily decline in hatchability of slightly less than one percent.

Drive-In Dairy Sales

▶▶RELIANCE DAIRY FARMS at Los Angeles have undertaken their third milk and dairy product drive-in facility. Traffic lanes accommodate five rows of cars simultaneously. A 6,000 sq. ft. refrigerated storage room is a requirement of each facility. Cost is reported at $120,000.

Hygrade Adds To Montreal Facility

▶▶TO INCREASE present production capacity by 50 percent, Hygrade Food Products of Montreal, Quebec is adding a wing to the plant built in 1957. This construction will provide space for new high speed processing and packaging equipment for refrigerated and frozen varieties of sausages and cooked meats.

One packaging machine alone will cost $35,000. Total cost of the extension will be $150,000. Products from this plant are distributed daily by a fleet of 45 refrigerated trucks to principal cities in Quebec, Ontario and the Maritimes. Full implementation of the expansion program will raise the plant's capacity to around one million pounds a week.

Quebec Farm Plan Includes Cold Storage

▶▶BACKED BY French cash, a new Canadian Company—Soca Ltee—is embarking on a major corporate farming operation in Quebec, according to the FINANCIAL POST, Toronto. Soca, a holding company, owns 65 percent of the Canadian venture which plans large scale vegetable processing and cattle raising. The company's plans call for the construction of a 7500 ton cold storage and processing plant at Sherrington.

Empire Cold Storage Opens Additional Space

▶▶PLACED IN OPERATION at the end of October was an additional 330,000 cu. ft. of storage space at Empire Cold Storage, Ltd., Montreal. According to President Harry Cohen, this adds 210,000 cu. ft. to an existing 750,000 cu. ft. of low temperature holding space. An additional 120,000 cu. ft. was added to the cooler facilities. The addition was commenced in mid-July.

Another Canadian Storage

▶▶EARLY IN OCTOBER the FINANCIAL POST of Toronto carried an item which indicated the Mayor of Moncton was negotiating with private interests for the establishment of a cold storage plant. The Canadian paper quoted the Mayor as saying, "the city was the hub of the Nova Scotia blueberry industry but that the nearest cold storage plant was located in St. John". He envisioned a plant that would handle blueberries, vegetables and fish; a public refrigerated venture.

Poultry Institute Issues Report

▶▶INVENTORY FIGURES on turkeys in storage on September 30 have been released by the Institute of American Poultry Industries. The semi-annual report is compiled from figures received from member warehouses of NARW, according to Harold M. Williams, president of the Institute. The report does not include any turkeys held in other than public warehouses, and indicates a total of over 83 million pounds in storage. Turkey time finds 166 warehouses storing the birds as compared with 216 last year.

Upstate N.Y. Center For Swift & Company

▶▶EXPECTED TO BE ready for use early next Spring is a new distribution center and warehouse for Swift & Company at Albany, N. Y. To serve the Capitol district, the new facility replaces the building destroyed by fire two years ago. Since the fire, local operations have been conducted from leased space.

The one-story building of reinforced concrete will contain a larger cooler for fresh meats and a freezer for frozen packaged product. Loading facilities will be provided for ten refrigerated trucks.

New Fish Freezer

▶▶RESOURCES MINISTER Uziak recently announced that a new $60,000 fish filleting, freezing and packing plant will be built at Pelican Narrows, 150 miles northeast of Prince Albert. Cost will be shared by the Provincial and Federal governments and the local fishermen's cooperative.

Canadian Co-Op Builds Cold Storage

▶▶BUILDING of a cold storage warehouse in Farnham by the Apple Growers Co-operative, at a cost of $170,000, is an addition to two others now owned. Bedford Fine Food Products, Ltd. will take up the greater space for the storage of fruits and vegetables grown in the district.

Western Grocer Storage

▶▶CONSTRUCTION started early in the Fall on a $900,000 warehouse for Western Grocers, Ltd. in Regina. The one-story building will cover over 100,000 sq. ft. Refrigeration storage in the new building will accommodate 32 carloads of fresh fruits and vegetables.

Zero or Below

Principle NFFDA Convention Topic

▶▶▶ PRINCIPLE SPEAKERS at the National Frozen Food Distributors Association annual convention in Chicago late in October appeared motivated by one thought, "Zero or below". John T. Kirk, President NFFDA, William Baker, President, National Association of Refrigerated Warehouses and Gerritt Vander Hooning, Past President, National Association of Retail Grocers of the United States all expressed concern regarding the "Zero F or below" provision of the model frozen food code.

Harold Clark, President, Association of Food and Drug Officials of the U. S., defended the provisions of the code and suggested that while most food and drug officials of those states which may adopt the code, will apply the provisions with moderation over a period of time, all those involved should put their house in order.

Other speakers like John B. Fowler, Jr. of Seaman Brothers—Seabrook Farms Co. and W. John Thiessen, Jerseymaid Milk Products Co. visualized miles of refrigerated shelves for frozen foods, and miles of mechanized and automated conveyor equipment for the efficient and low temperature handling of frozen foods in the 1960's. Thiessen showed where the distribution warehouse (his own firm) is already using such equipment.

State-of-the-Union Talk

NFFDA President Kirk stated that the history of frozen food business is contained in the annual presidential message. He received the state of the union talks of his predecessors of the past four terms. Drawing on the Bible for quotations and commandment examples, he cautioned his distributors not to choose up sides and debate the question, but rather concentrate on what must be done. For the first commandment of food marketing, he stated: "Thou shalt not ignore those who eat your products". Second commandment: "Thou shalt not forget that frozen foods are different because they must always be held at zero temperature."

Kirk stated that he did not know of any fundamental principle more widely recognized, nor one as widely ignored. As a result of failing to sell the consumer on the virtue of the product and to refrain from price cutting, he pointed out that the industry had also cut priced its handling methods.

In discriminating franchising of low cost wholesalers meant distribution by those who were not equipped to handle frozen foods. That type of distribution was not and is not now possible for frozen foods, he said. All too often this commodity has been treated as a dry grocery product.

Temperature difference between dry groceries and frozen foods poses two problems in distribution, Kirk told the Chicago audience. Not only must they be transported at different temperatures, he said, but they must also be held at different temperatures in the retail store.

The wholesaler who transports mixed loads, may do so safely in non-refrigerated trucks if the frozen commodity is protected by insulated containers, or by blankets and dry ice. However, the problem in the store is more difficult to solve. Generally, Kirk related, there is little zero capacity there. Frozen foods, therefore, must be delivered two or three times a week. That's a highly uneconomical delivery schedule for dry grocery distribution.

Mal-practice Promoted Code

Codes came into existence, Kirk continued, because the industry ignored its responsibilities. The industry refused to see to it that the frozen foods that the housewife brought home were the same quality as when they left the packer. He added that he suspected AFDOUS temperature codes will have little real lasting effect, but would cost the industry a great deal of trouble and money. Without the will to reform, the reform generally lasts only as long as a policeman remains in sight.

Kirk stated that such a situation would be a great pity. Poor handling methods are a very real road block standing in the way of progress for the industry. He contended that the industry could correct these abuses without the questionable help or insistence of state authorities. Florida packers, he pointed out, had already made a move in that direction; other packers are beginning to take a second look at their programs. For those reasons, he said, 1960 will be a year of decision for the frozen food industry. There will be a *New Look* in the business.

Warehousemen Ready

Refrigerated warehousemen are more ready than any other segment in the industry, for zero temperature enforcement. That's what William Baker, President, NARW, told NFFDA members on October 26. He add-

Officers of the National Frozen Food Distributors Assn., Standing. l. to r. Harry K. Schauffler of New York City, executive director, Arthur Boone of Austin, Texas, Southwestern Vice-president; E. M. LaBaron of Modesto, Calif., Western Vice-president; Roscoe Loewe of Pensacola, Fla., Southern Vice-president. Seated: Frank Hicks, of Austin, Texas, Secretary; John T. Kirk of Cleveland, Chairman of the Board; Robert Grant of Saginaw, Mich., President, and Howard Jester of Wilmington, Del., Treasurer.

ed that they are ready to work also on refinements in the proposed code and the determination of proper tolerances by state officials. He added, however, there was some confusion reigning at present.

While all links in the frozen food distribution chain concur that the over all objective of the code is quality the warehousemen like packers, truckers, distributors and retailers were somewhat confused as to what they are supposed to do. He outlined the five uncertainties. Warehousemen want to be certain that

1) the Code isn't unnecessarily rigid;

2) that there aren't too many impractical regulations which restrict the normal flow of product through refrigerated warehouses;

3) that no segment of the Industry is to be made the "policeman", as the warehouseman appears to be in the present wording of the code;

4) that warehouse customers are not deterred from serving *their* customers when they have good, wholesome food just because of a technicality—a lack of proper tolerance;

5) that if a change is necessary, it be taken slow and easy with stipulated intermediate tolerances.

Two other considerations were outlined by Baker. The possibility that temperature taking requirements will be too burdensome and costly to someone, was one. Another concerned the packer and warehousemen alike. Interpretation of the code might find well established and accepted operating practices of freezing would require changes. The temperature should be the measure, not the method used, according to Baker.

Inadequate Facilities Says Leading Retailer

Spokesman for the retailers, Gerritt Vander Hooning of Van's Food Department Stores said that with few exceptions just about all facilities including trucks, railway cars, some warehouses and display cases appeared to be completely inadequate if "Zero or below" temperatures are enforced as outlined in the AFDOUS Code. He contended no frozen foods would ever reach the first warehouse.

This speaker related how his firm, in cooperation with the National Association of Retail Grocers, gathered data from retail shops across the country regarding temperatures at which they receive frozen foods, at which they store them, and at which they display them. He emphasized the experience of his own firm.

Emphasizing that no retailer can sell a good product unless he receives it, and pointing out that there was no way of rehabilitating or adding anything to a frozen food product that has once had a temperature of above zero for any length of time, Vander Hooning detailed a four-week test. The results, he stated, really carried a shock.

Non-Refrigerated Trucks

On Wednesdays their retail stores receive a small shipment on a regular grocery truck. These trucks carry several large insulated chests holding about 35 cartons of frozen merchandise, each. The first shipment temperature check showed 38-42 F.

Executives were told the chests were rolled into the big freezers at night, loaded and then dry ice placed in them, then rolled into the delivery truck against the bulkhead with all the grocery delivery packed around them. That was supposed to hold the cold.

In the four-week test, he related, and with the cooperation with the frozen food supervisor in his company owned warehouse, the best temperatures that were recorded were a plus 32, plus 19 and a plus 28 F in those delivery van holding boxes (presumably the plus 19 was the temperature of the center chest).

With Refrigerated Vehicles

On Friday mornings, Vander Hooning related, the retail stores received a large shipment of frozen foods in the so-called frozen food trucks. The lowest temperatures that they were able to get in a refrigeration equipped truck was plus 18 F. Usually the temperatures ranged all the way up to 34 F. The lowest product temperature recorded was 10 F, but ranged as high as 28 F, after being delivered in these vehicles. Placing these packages at 18 F in the freezer in a direct blast took seven hours to get them back down to zero F!

Vander Hooning also pointed out the ice cream delivery in heavily insulated refrigerator trucks came into the retail supermarket at plus 5 F. Compliance with the code, he indicated, would put the retail grocer out of the ice cream business at those temperatures. He suggested that the retailers would be asking themselves another question; that is, are frozen foods and ice cream so profitable to handle that the retailer can go to the extreme of buying new equipment, rewire the stores for heavier electrical loads and still face penalties of legislation requiring zero F or below?

He cited time study tests made on handling frozen foods and ice cream which indicated a net loss of $123.30 per week on those two departments during hot weather. He concluded his remarks by addressing processors, transportation agencies and distributors to the effect that more knowledge, improved research and a really effective educational program was needed to all levels, including customers. He emphasized that an educational team had to include the equipment manufacturers.

Code Not Surprising

Readiness for zero temperature enforcement was the question posed by the president of AFDOUS, Harold Clark. After summarizing the activities and research leading up to the writing and adoption of the model frozen food code*, three important factors were noted by Clark:

1) that there appeared to be a definite need for changes in the frozen food industry if quality of such foods was to be maintained;

2) that zero F or lower temperatures are essential if quality is to be maintained from the packer to the ultimate consumer;

3) that the adoption of the AFDOUS Code should not have come as a surprise to anyone in the frozen food industry, as it has actually been in the making for the past three years.

The code as adopted includes a section on retail distribution, one on warehousing and one on transportation. The remaining phases of the code, covering the microbiological aspects and manufacturing practices are still being explored and may, perhaps, be ready for adoption at the next annual conference of the Association.

According to Clark, adoption of the AFDOUS Code for the guidance of regulatory officials is but one phase of utilization. He pointed out that industry can now use the code to overcome some existing unfavorable conditions. As an example, he pointed out that leading retail grocery chains have issued orders to their stores which include provisions for immediate placing of frozen foods under zero F temperature when received, to discontinue overloading the display cases and to employ first-in first-out merchandising.

Improved Service Essential

Service departments have been instructed in the inspection and maintenance of refrigeration systems for both display cases and back room storages. Suppliers to these chains have been informed that product temperature of frozen food delivered

* Copies of the AFDOUS quarterly bulletin which contain the Code may be obtained at $1.00 each.

AFDOUS Code Discussed By Retailers, Distributors, Warehousemen

should be zero F or lower, and no deliveries would be accepted if temperatures varying from 5 to 10 F were exceeded.

Clark contended the AFDOUS Code is a realistic one, basically providing for a product temperature of zero F. Definitions have been clearly spelled out, he said; provisions dealing with equipment and handling practice leaves slight chance of misconstrued meaning. The code in its present form embodies necessary requirements for improved quality of frozen foods when enforced or put into practice by industry. His statements, he said, were not to be construed as meaning that the code cannot be improved upon, nor should the industry forget that uniformity is of utmost importance. It would be much easier for the frozen food industry to operate under one uniform code than under a different regulation in each state or municipality.

Enforcing must be on somewhat of a gradual and tolerant basis, said the AFDOUS president, bearing in mind that eventual compliance is the objective. He reminded those who have been inclined to idly sit back and criticize that competitive industrial practices will force changes which may be as effective as a regulatory agency.

Refrigerated Shelving Measured By The Mile

Having considered the pros and cons of the frozen food code, the frozen food distributors began to look at the more practical aspects of the distribution industry. Miles of refrigerated shelves will carry frozen foods in the 1969 supermarkets, said John B. Fowler, Jr. This national food merchandizer and packer said that prepared frozen foods will reach the four billion package quantity per year by 1969. Stacked vertically, that quantity could reach half way to the moon. He estimated the annual sales of frozen food at five billion dollars.

Supermarkets of 1969 will see a change in the conventional frozen food cases of 1959. According to Fowler, these displays will consist of refrigerated shelves, protected only by a thin curtain of air through which customers can easily reach for the frozen food packages. A number of U. S. case manufacturers have had this equipment under test for many months and production is expected in 1960.

Improved packaging, greater product diversification, new executive talent and continuing research are essential, Fowler said, if frozen foods are to reach their full potential. He emphasized continuing research and predicted that U. S. industries will be spending 20 billions annually for research—nearly three times today's total—in 1969. Outlays for new plants and equipment will be some 60 billions yearly.

Automation To Meet Distributor Problems

Highlight of practical presentations was The Frozen Food Warehouse Story, an illustrated talk by W. John Thiessen, Los Angeles. Miles of conveyors to go with those miles of refrigerated shelving are an actual fact at Jerseymaid Milk Products Co. Thiessen described a 32,000 square foot refrigerated area for frozen foods; nearly 2/3 of one million cu ft sub-zero space (320 x 100 x 22 ft.). Of this space 1/3 is occupied by the automatic-mechanized order filling system.

Jerseymaid, a frozen food distributor, employs insulated route delivery trucks and trailers ranging in length from 25 to 35 ft. They are refrigerated either by ammonia activated eutectic plates which are charged through dock connections or butane operated Transicold units mounted on the underside of the trailers.

Receiving is by truck or by rail. Truck receiving is at the rear end of a shipping dock with enough room to accommodate fourteen 40-ft. trailers. Rail receiving is across the rear of the building, with eight car spots.

Merchandise is received on pallets. Controlled ordering assures even pallet loads which eliminates a large percentage of partial pallets in the storage area.

Merchandise is stacked four pallets high, using stacking irons. Pallets average about 85 cases each, standardized at five foot heights, which allow full use of the 22-ft ceiling throughout the storage area.

All Down Hill From Here

Thiessen described how merchandise is transported by fork lifts from the storage area to the order filling section. Merchandise to be used in the automatic lines is raised by means of special fork lifts to a 13 ft 4-in. platform at the rear of the system. There, Thiessen said, it is placed on rollers which enables a stock man to move pallets to the desired filling location. Flow lines identified by product code numbers are filled from the rear.

Up in the front office, order blanks are routed to I.B.M. equipment where key punch operators transfer the information from order blanks to I.B.M. commodity cards. The cards are then run through an I.B.M. printer for invoicing; then go back to readers.

Cards feed across the I.B.M. readers, transmitting quantity and product code number to the master control panel. At the master control panel, code numbers are decoded to a location number within the automatic system inside the warehouse.

"The Escapement"

Impulses from the panel are sent to electrically operated sections in the ends of 120 automatic flow lines. Thiessen explained that this section of the roller conveyor set up, is called the escapement. These 120 automatic flow lines, each with a different item, are operated at four different levels. Each level has its own memory circuit in the master control panel which allows only one line per level to release at a time. One line from each level, however, can be released simultaneously which means that four lines would be feeding on to four collector belts working on the same order.

Cased merchandise is carried down the powered collector belts at 300 fpm. Two live roller sections receive from the pairs of collector belts, bringing the orders from four levels to two levels where they flow through controls which will eventually feed into one solid line at the point where the automatic joins the manual portion.

Surge Lines Smooth Flow

Delivery surge lines provide accumulation for approximately 600 cases. With actually five lines feeding to each single delivery line, it is impossible to take cases off the end of the truck line as rapidly as they are fed. Metering belts assure a constant evenly spaced flow of merchandise in the surge lines to the outside dock belts.

Once outside, merchandise is carried on overhead powered dock belts to the portable chutes which can be moved to any desired loading space. Portable chutes mounted on rollers include telescoping roller conveyors which reach forward into the trucks, bringing merchandise right to the loader.

USDA exhibit at National Frozen Food Distributors Association Meeting, Chicago, October. Research Strengthens The Chain Of Frozen Food Distribution was the heading of a 6-panel display. Flat links between grower and packer, transportation to warehouse, warehouse to distributor, distributor to retailer and retailer to housewife, carried the legend: Avoid Temperature Damage, Keep Temperatures LOW. Pictured, left to right are Harry Clark, President, AFDOUS and representative of the Connecticut Food and Drug Commission, Harry Schauffler, NFFDA Executive Secretary; and W. F. Talburt of the Western Utilization Research and Development Division, USDA.

Industrial Refrigeration's correspondent on the job in and around the USDA booth, drew the impression that a great big educational job remains to be done. "Top level people understood temperature damage but the fellows who are operating the trucks and the retail stores don't have a clear and adequate concept of the problem. Why frozen foods are easily damaged by inconsistant temperatures is just sufficiently complicated," this representative reported, "that it will take some good thorough education to convince them."

Commercial Cold Storage Establishes At Atlanta

▶▶OPENING in mid-November is a modern cold storage warehouse in Atlanta, Georgia, to be known as Commercial Cold Storage, Inc. The refrigerated enterprise is located on an 8-acre site on the South Expressway, in a new industrial development where the Carling Brewing Co. and Gordon Foods Corp. have already located their new Georgia plants.

President of the new company is B. C. Simpson, Vice-presidents, Ben F. Brady and John C. Vandegriff. The firm plans to maintain sales space, as well as offices in New York and Chicago under Vandegriff and George W. Eggert, respectively.

Half Million Cubic Feet

Of single floor construction, the company's refrigerated warehouse will provide a half million cubic feet, divided between cooler and freezer storages. Two and one-half acres of truck parking space, dock space for 20 trucks and a Central Georgia rail siding assure adequate transportation access. The warehouse is convenient to both the State Farmers Market and the East Point Wholesale Grocery Center.

DOCK ICER

COSTS LESS
FORMS ALL OTHERS

This fast two man machine is nearly twice as fast as competitive models that require 4 to 5 men for operation.

A new ice breaking principle breaks the ice blocks to bunker ice faster with amazing uniformity of size.

The Conveyco Dock Icer design eliminates much heavy and expensive auxiliary equipment, giving a lighter overall weight. Major savings are reflected in lighter dock construction.

Both hatches of a railroad car can be iced at the same time. An automatic salting unit controlled from the cab permits simultaneous bunker icing and salting...gets the job done in half the time.

Why not check one of our installations and learn first hand about the low initial cost and how low maintenance and operating costs really are...wire or phone today (LUdlow 2-8411).

CONVEYCO

THE CONVEYOR CO.
ENGINEERS and MANUFACTURERS
5260 E. Slauson Ave. Los Angeles 58, Calif.

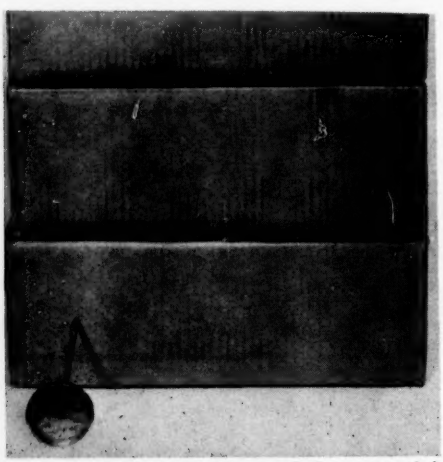
Frozen Foods Handling:

KNOW THE TEMPERATURE BY TAKING IT

Steps In Temperature Taking

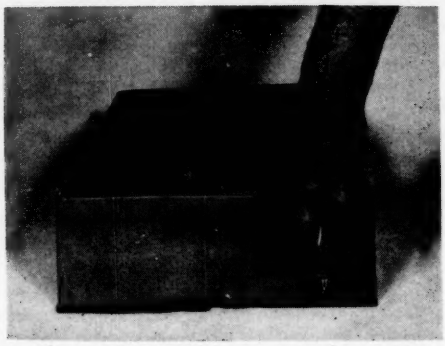
After opening the top of the case and removing a top corner package, a hole is made through the case from the inside. Hole is lined up with a second layer of product. An ice pick or sharp punch is used; never the thermometer.

Place the thermometer in the hole from the outside so that the sensing element is about three inches in from the case walls. Place package back in its place and close the case.

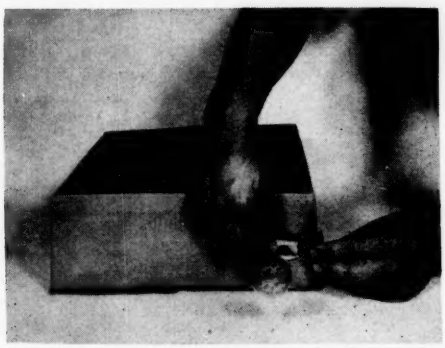


Place two or more cases on top of the original box to assure contact of the stem with the package of product. Read the temperature after 5 minutes.

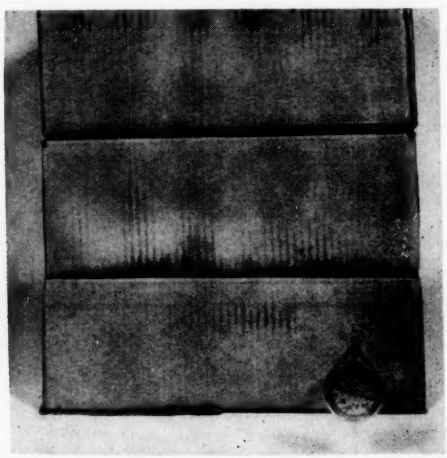
Alternative Checking Procedure



Cut a wedge in the outside case near the position where the corner package meets the second layer. Conventional case cutting hand tools may be used and the customary care taken not to damage interior contents.



Insert the thermometer stem between the first and second layer of packages, taking care that sensing element is in three inches from the case walls. Close the wedge tightly.



Place two or more cases on top of the original box to assure contact of the stem with the package of product. Read the temperature after 5 minutes.

TRRF Reprints Available

▶ FORMAT of the INFORMATION BULLETIN, TRRF, changes pleasantly and most usefully from issue to issue. September Bulletin lists three reprints available from The Foundation, devotes two pages to recent publications of possible interest, and the 4th section of the bulletin is devoted to items of interest for the refrigerated food industries.

One reprint is from CANDY INDUSTRY TECHNOLOGY by Dr. J. G. Woodroof, titled "Nine Factors Effect Candy Stability". Dr. Woodroof had given the paper before the National Confectioners Association and the American Association of Candy Technologists at a June meeting.

Other Publications

Almost weekly, various bulletins and reports are released by the Agricultural Marketing Services, USDA, which contain data of significance to the perishable food industry employing refrigeration. Among the more recent releases which are not reported on elsewhere in the issues of INDUSTRIAL REFRIGERATION are an Amendment To United States Standards for Frozen Field Peas and Frozen Black-Eye Peas.

Most useful monthly is the COLD STORAGE REPORT. Released approximately mid-month, the data contained is as recent as the last calendar date of the previous month. INDUSTRIAL REFRIGERATION has until recent years, summarized the contents. It was learned that most interested readers subscribed to the REPORT. Hence the editorial pages have been devoted to mention of other less well circulated reports.

For the newcomer who is not familiar with the COLD STORAGE REPORT, it should be noted that this monthly generally contains an analysis of the previous month's storage holdings, and occupancy, reports on net changes in storage holdings, and then breaks down the major commodities. Some of the categories or headings are as follows: fresh fruits, vegetables, and nuts in storage; frozen and poultry products in storage.

Other statistics are also given in the REPORT. For example, cold storage holdings by geographic regions; commodities stored in public cold storage warehouses; certain commodities in storage owned by the Government; space and occupancy in public warehouses in selected cities; space and occupancy in public refrigerated warehouses.

Canadian Counterpart

The Dominion of Canada similarly publishes a monthly report at a price of $2.00 per year. However, their catalog, as they refer to it, deals primarily with commodities stored; does not give geographical lists.

Some associations also make available other statistics on refrigerated National Association of Frozen Food Packers releases various pack surveys as a service to the industry. Recent releases indicated the 1959 frozen pack of spring spinach as a new high, and the asparagus pack was one-half larger than previous years. A table is generally attached to the release which details frozen production.

Frozen Food Vessels

▶ JOINING a fleet of vessels operating under the German flag was the 1500-ton refrigerated vessel *Ursula Horn* in mid-November. The vessel is designed to transport frozen tuna fish, meat, fruits, vegetables and other perishables between the Caribbean, Peru and other Pacific ports. According to the NEW YORK JOURNAL OF COMMERCE, the ocean going fleet of deep-freezers, operates under German-American Auspices out of headquarters in Hamburg, Germany.

GET ACCURATE FLOODED SYSTEMS CONTROL

with this level regulator

A SIMPLE CONTROL IS THE BEST CONTROL

PHILLIPS
FLOAT CONTROLS

- **Proportioning action for smooth feed at all capacities**
- **Tight Closing with Teflon seat discs**
- **Self actuation—no electrical or pneumatic connections needed**
- **Visible liquid level through exclusive "Level Eyes"**
- **Adjustable level achieves maximum capacity with minimum charge**

IN ADDITION — Phillips pilot operated valves are available for all common refrigerants, down to —50° F. Operates with as low as 2 PSI pressure drop and up to 250 PSI with selected springs. Line sizes ½ inch to 4 inches with steel or copper connections.

Solve your flooded system design and application jobs by consulting Phillips. Our firm of engineers have specialized in level control, liquid-vapor separation, liquid circulation and return systems for over 28 years.

H. A. PHILLIPS & CO.
Designers and Engineers
Refrigeration Control Systems
3255 W. Carroll Ave.
Chicago 24, Illinois

NOW important savings for cold storage

New J-Foam

J-Foam is

Remarkably Lightweight!

A cubic foot of J-Foam weighs only one pound; a single workman can easily carry a dozen sheets at a time.

Large sheets are easily,

Quickly Installed...

operators with—

Insulation by Johns-Manville

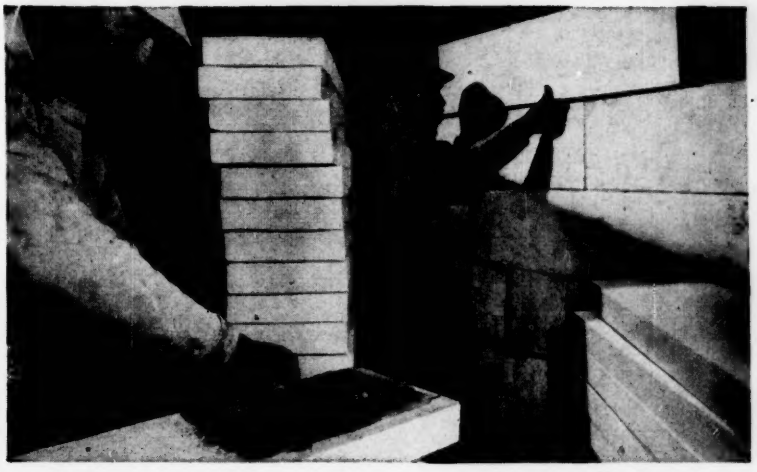
An improved, expanded polystyrene insulation . . . J-Foam reduces installed costs, assures long-term operating economy

COMPARE J-FOAM with other coldroom insulations and see the difference it makes in installation cost alone. See how easily it handles . . . how quickly it is installed . . . how well it can be applied to either wood or concrete construction.

After installation—savings go on year after year. For J-Foam's conductivity (Btu-in./hr/sq ft/F) is *extra low*, only .23 at 19F—.25 at 40F—.27 at 70F. And keeping conductivity always low is J-Foam's moisture-resistance; its water vapor permeability, for example, averages only 1.5 perm inches.

Let us send you the new J-Foam brochure, IN-209A. Write for it today. Address Johns-Manville, Box 14, New York 16, N. Y.

One man can easily place a sheet of J-Foam in position and hold it momentarily while adhesive grips. Lightweight . . . larger sheet sizes . . . ease of securing—all work to speed installation.



J-Foam Is Strong...

ideal for self-supporting partitions.

J-Foam's high strength and resilience solve many installation problems. It is ideal for self-supporting partitions... for walls, floors and ceilings of wood or concrete construction. J-Foam is also easy to cut; provides excellent surface for adhesive fastening.

See the informative new color motion picture —"Heat . . . the science and economics of its control." Ask your J-M representative.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

FROZEN FOODS TO RECEIVE BEST HANDLING PRACTICES

▶▶SECOND regional educational seminar for key operating personnel in the refrigerating warehousing industry on the subject of good handling practices for frozen foods, will take place January 28 and 29 at the LaSalle Hotel, Chicago. The first such seminar took place in San Francisco September 22 and 23. The third will take place in New York City early in February 1960.

Left to right, Dr. Walter A. Maclinn, Managing Director, TRRF; Millard W. Young, President, and Wm. Giacomazzi, Jr., Director. All three figured prominently in the 1st seminar at San Francisco.

To date, public refrigerated warehouses are the only segment of the frozen food business offering an industry wide educational program on the proper handling of this low temperature perishable commodity. The program designed by The Refrigeration Research Foundation, presents to warehouse operating personnel the latest scientific and practical information on how to protect frozen foods from temperature damage.

TRRF Sponsors Food Research

TRRF is a non-profit organization engaged in initiating and sponsoring scientific research at educational institutions and other food research installations. The Foundation is supported by many public refrigerated warehouses along with other food industry groups. The seminars on frozen food handling contain much data offered through the Foundation's Scientific Advisory Council. Much of the information is drawn from the Time-Temperature-Tolerance studies of USDA which were supported in part by TRRF.

Fifty-four representatives of 19 public refrigerated warehouses on the West Coast, who were in attendance at the first seminar on good handling practices for frozen foods, held at the Hilton Inn, International Airport, San Francisco.

Attendees at TRRF Seminar San Francisco, September 22 & 23, 1959

Beall Refrigerating Company, Santa Clara
Bercut-Richards Cold Storage Co., Sacramento
Crystal Ice & Cold Storage Co., Sacramento
Dreisbach Cold Storage Company, Oakland
Fresno Consumers Ice Company, Fresno
Lincoln Cold Storage Co., Lincoln, California
Mainland Ice & Cold Storage Co., Vancouver, B. C.
Merchants Ice & Cold Storage Co., San Francisco
Merchants Refrigerating Co. of California, Modesto
Modern Ice & Cold Storage Co., San Jose
National Ice & Cold Storage Co. of California, San Francisco, Calif.
Northwestern Ice & Cold Storage Co., Portland, Oregon
Refrigerated Food Services, Inc., San Jose, California
Sanger Ice & Cold Storage Co., Sanger
Santa Clara Cold Storage & Freezer Co., Santa Clara, Calif.
Terminal Ice & Cold Storage Co., Portland, Oregon
Terminal Refrigerating Co., Los Angeles, California
Turlock Refrigerating Co., Turlock
Union Ice & Storage Company, San Francisco, California

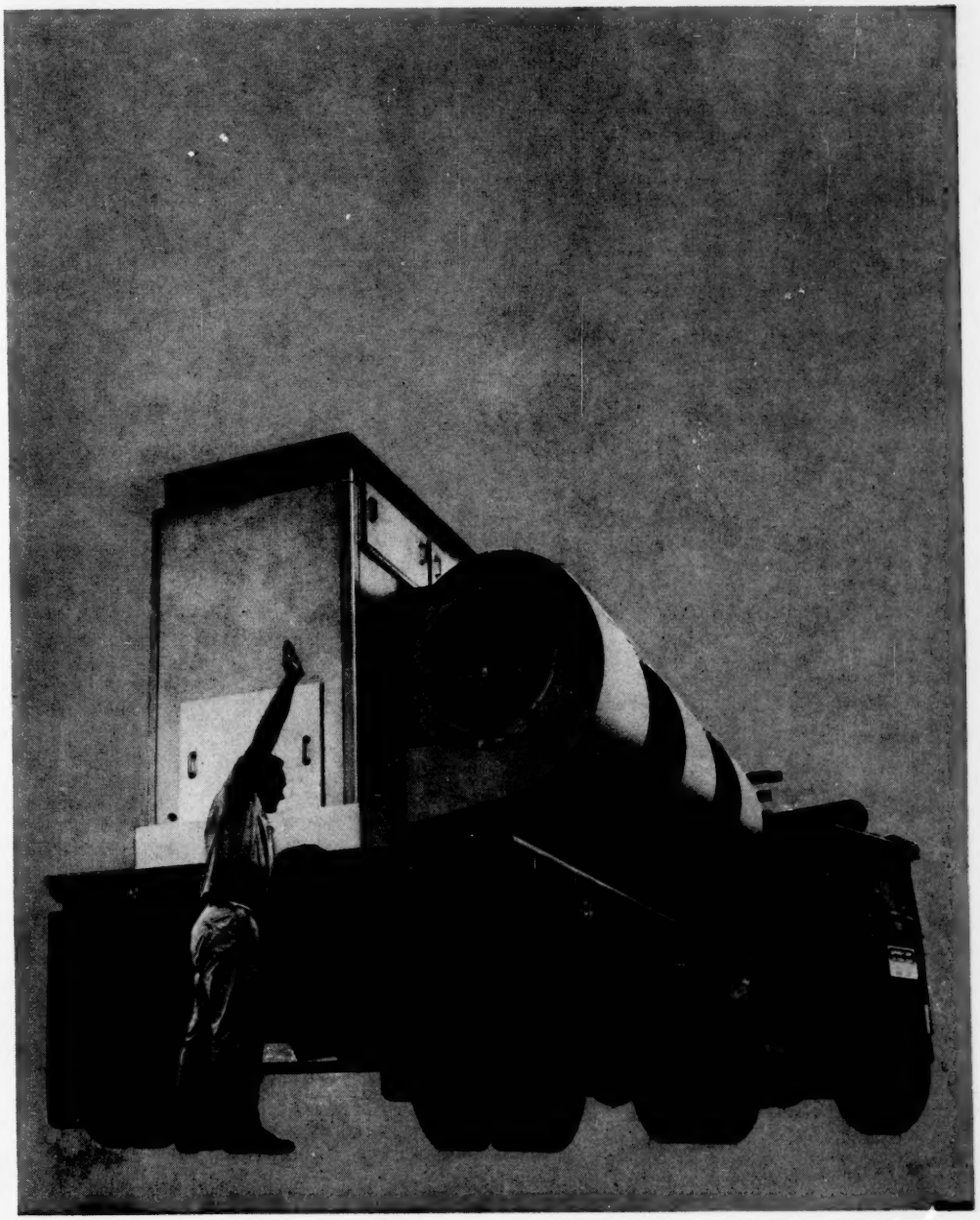
Warehousing personnel have both recording and indicating potentiometer type temperature instrument explained to them by Jack Howard, Minneapolis-Honeywell Regulator Co. Dr. W. A. Maclinn, TRRF Director, observes the method.

Engineering the temperature...

with a ONE PIECE, 233 TON Evaporative Condenser. Factory assembled and shipped as a unit, the compact DF-41A is only 93" high, 96" wide and 247" long.

RECOLD **CORPORATION**
7250 East Slauson Avenue, Los Angeles 22, California

RECOLD



NEW CENTRAL WAREHOUSE FEATURES UNATTENDED PLANT

Operating Efficiency Attained With Two-Stage Two-Step Capacity

▶▶▶RAPID GROWTH of the frozen food industry in recent years has been partly due to the development of more efficient and economical low temperature refrigeration systems for food freezing plants and refrigerated warehouses. Lowered losses from food spoilage and lower operating costs have made it profitable for many new freezing firms to enter the field.

Cold room temperatures should average near minus 10 F for the proper storage of frozen foods. How well any plant maintains this temperature depends mainly on two factors: (1) a dependable refrigeration system; and (2) a well-designed and insulated plant. Recent developments in refrigeration equipment and building materials have increased the success with which these factors can be handled, as demonstrated by the New York consulting firm of Van Rensselaer H. Greene who designed the modern frozen food storage for Central Warehouse Corp.

At the Corp.'s new Fuller Road warehouse in Albany, N. Y., minus 8 F cold room temperature is maintained to within one degree of variation by a new automatic low temperature refrigeration system serving a warehouse thoroughly designed and engineered for minimum heat gain. This temperature is not affected by variations in load, seasonal changes, or heavy warehouse traffic.

Operating Flexibility

Compressor equipment consists of sors by Freezing Equipment Sales, 100 tons of refrigeration when all four units are in operation. For small- stage (see Fig. 1). Total capacity is Inc., York, Pa., on low or booster two York 9x9 VSA units on high stage and two FES-Fuller rotary compreser loads, the units are set up to operate alternately.

This arrangement is made up of two sets, with one high and one low stage compressor to a set, designated as set "No. 1" and "No. 2". No. 2 is the base set, and as demand increases, No. 1 is cut into the line to provide additional capacity. Capacity is automatically regulated according to demand by means of controls which sense changes in pressure.

Normal sequence of compressor operation is as follows: Both sets or all four compressors are in operation under full load refrigeration requirements. The rotary booster suction pressure pulls down as the requirement for refrigeration reduces. A suction pressure control senses this change and actuates 50 percent capacity unloaders on the rotary booster and high stage compressor of set No. 1. The operating speed of both compressors of unit No. 1 do not change but horsepower and capacity are reduced.

If suction pressure continues to pull down, unit No. 1 will shut off automatically. The built-in check valve in the discharge of the rotary obviates the necessity of hand-closing any stop valves.

Unit No. 2 rotary and high stage compressor are not equipped with capacity unloading. However, they are installed so that unit No. 2 will stop and restart automatically as suction pressure falls below a fixed control point.

As rotary booster suction pressure rises, indicating an increase in refrigeration requirements, the cycle of operation as described, will reverse itself.

Special System For Low Temperatures

Because of the long suction lines and low design temperatures common to the frozen food industry, suction gas temperatures are higher and pressures lower than other refrigeration applications. These two conditions tend to reduce the capacity of the system and increase the horsepower per ton of refrigeration required.

A booster compressor must be capable of efficiently handling a large volume of suction gas at a low compression ratio. This inherent design feature of a rotary type compressor makes it ideally suited for operation at low suction pressures where gas volume per pound of refrigerant handled is high. The rotary is designed for this duty and limited to a pressure difference across the machine of not more than 45 pounds.

The high stage reciprocating compressor is especially adaptable for refrigeration gas pumping at high pressure differences across the machine. Their best gas handling capacity is at higher suction pressures where gas volumes are not so great for each pound of refrigerant pumped.

At Central Warehouse, the team-up of reciprocating and rotary compressors functions to maintain system capacity in spite of low suction gas pressure and other factors. Combination of the two types of compressors give Central Warehouse the most efficient and economical arrangement of compression equipment, according to the designers.

Booster Features Increase Efficiency

Two other features of rotary boosters assist in making the Central Warehouse automatic system more efficient, according to manufacturers of this type of equipment: (1) a built-in capacity unloader which enables the rotary to remain in operation at up to a 50 percent reduction in load; and (2) fully unloaded starting, which means lower starting power requirements.

First of these two features works to maintain intermediate pressure and a consequent easing of the high stage up to 50 percent of capacity. Unloading feature on the rotary compressor is built into the machine and is unique for this type of compressor design. An expansion pocket is built into the rotary booster cylinder along its length (see lower inset, Fig. 2). This pocket connects with the inside of the booster just below its normal suction inlet port.

External by-pass piping, mounted on the booster (shown also in Fig. 2), bleeds higher pressure and higher temperature discharge gas from outlet of rotary to the expansion pocket. This gas expands through the pocket and converts "pressure energy" to "work energy" by helping to turn the booster rotor. Pressure conversion in the expansion pocket actually cools the by-passed gas and reduces the booster horsepower requirement.

A solenoid valve in the external by-pass line of the booster opens

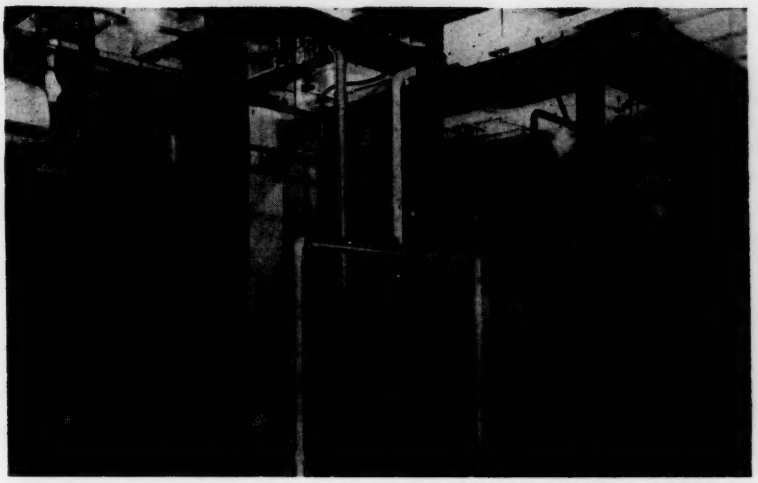


Fig. 1. Engine Room of new Central Warehouse. Two FES-Fuller booster compressors at center and two York 9x9 VSA high stage compressors at right are arranged alternately as into two operating sets or teams.

Note also, the louvered vent back of the reciprocating compressors. Experienced refrigeration consulting engineers provide ventilation requirements in accordance with Section 8.11, Table 5, *American Standard Safety Code For Mechanical Refrigeration*, (ASA B9.1-1958).

and closes to regulate rotary capacity as the suction pressure rises and falls with change in refrigeration load requirements.

Unloaded Starting

Second feature of the rotary allows booster to start fully unloaded. This means that normal torque and lower starting current can be applied. The rotary booster consists of a rotor with its ends mounted on two roller bearings in a jacketed casing, or cylinder. The rotor is fitted with sliding vanes, or blades, which are free to move radially in and out of longitudinal slots (see again Fig. 2).

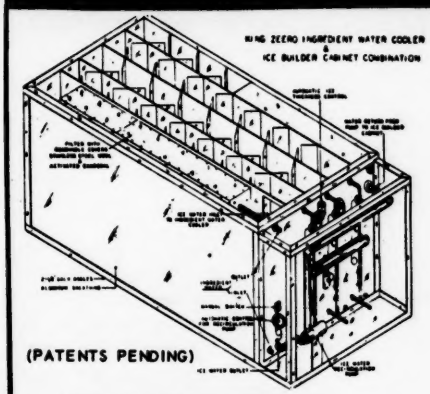
When the rotary is in operation, the vanes are forced out by centrifugal action and form a number of cells in which the gas is trapped and compressed. The vanes do not fully extend from the rotor until the booster turns over at 30 to 35 percent of its normal operating speed. Up to this point, the booster operates unloaded.

How Warehouse Was Insulated

The 45,000 sq. ft. warehouse was built with painstaking attention to the problems of effective insulation. These details were coordinated into the architectural and structural plans as prepared by the firm of Amman & Whitney, consulting engineers of New York City, in cooperation with Van Rensselaer H. Greene.

Continued in Col. 2, Pg 26.

For Ideal Filtered Ingredient Water at Low Cost

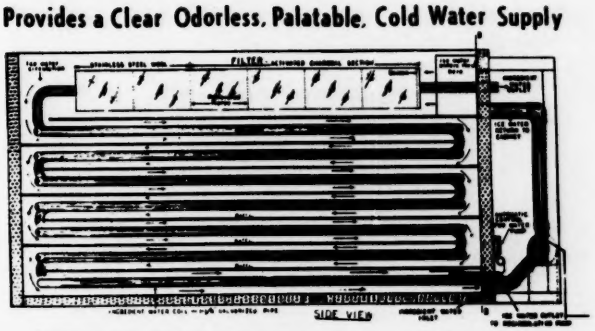


(PATENTS PENDING)

Choose "King Zeero's" NEW

PURE WATER COOLER

Provides a Clear Odorless, Palatable, Cold Water Supply



- Cools water 34 degrees Fahrenheit.
- Filter removes all silt, algae and chlorine from city or well water supply.
- Pure water is chilled by ice water -- *prevents freeze-ups.*
- The ideal water for ingredient and wash water applications -- food processing needs, butter or cheese wash, dough water, poultry or produce chilling.

Available in Cabinet or Vertical Styles.

The KING ZEERO Pure Water Cooler consists of a galvanized pipe water coil, a self contained efficient charcoal filter, a KING ZEERO Ice Builder and an ice water recirculation pump, with controls and necessary valves for flow and back wash, all contained in an integral unit

Write for Bulletin PWC 59.

THE KING ZEERO COMPANY
4300-14 W. Montrose Ave.
Chicago 41, Ill.
Manufacturers of Ice Builders - Ice Builder Cabinets - Ice Banks - Pure Water Coolers

Frozen Food Packer Addresses ARI Show

▶▶FROZEN FOOD Industries will continue to grow. The Refrigeration industry will have to grow to keep pace with it. These two statements were attributed to Harold J. Humphrey of White Plains, N. Y., President of National Association of Frozen Food Packers, by a special correspondent of the NEW YORK HERALD TRIBUNE.

Humphrey was addressing the Air Conditioning and Refrigeration Institute Conference in Convention Hall at Atlantic City, N. J. during the November All Industry Show. A research consultant for General Foods Corporation, Humphrey said requirements of the proposed uniform code by the Association of Food and Drug Officials of the United States, and the maintenance of zero temperatures throughout the distribution cycle from processor to ultimate consumer, *will mean new refrigeration, particularly for trucks, back room storage and retail stores, retail cabinets and home refrigeration.*

L.A. Wholesale Grocer Builds Third Freezer

▶THIRD FROZEN FOOD storage facility for the Market Wholesale Building Co. has been started by the Wm. J. Moran Co., Los Angeles contractor. This 12,000 sq. ft. cold storage structure is for the Glendale branch of the Market Wholesale Grocery Co. Halsey Chambosse, president of the Market Wholesale Building Co. said that the structure will cost $150,000. It is the third freezer facility for the grocer firm this year, according to the LOS ANGELES TIMES.

New Baltimore Storage

▶CORNCO, INC., a firm engaged in brand packaging of corn products is erecting a 2-story plant addition in Baltimore County. The first floor will be cold storage facilities and the second level for additional manufacturing purposes, said D. W. Mayborn, president, in BALTIMORE magazine.

Arctic Ice Survives Desert—Jungle Trip

▶REPORTED IN INDUSTRIAL REFRIGERATION in March was the plan of European Glass Wool Insulation Manufacturers to demonstrate the efficiency of their product by refrigerating a large supply of medicines on a one-month over-land truck shipment from the Continent to Dr. Schweitzer's Jungle Hospital on the Equator in Africa.

October Fires Damage Refrigerated Facilities

▶▶FIRE PREVENTION WEEK observed nationally seemed to hold down such disaster reports in the refrigeration industry during the first week of October. However, in the second week fire did $50,000 damage near Memphis and injured three persons. At Salt Lake City, another fire did considerable damage also.

Starting shortly after 10:00 p.m. October 11, in the cold storage building at Memphis Naval Air Station, fire did $50,000 damage. Although the building and machinery were damaged, $180,000 of meat supplies were removed without damage. A board of inquiry was convened to investigate and determine the cause.

J. C. Holman, fire chief, was injured fighting the fire but released after treatment in the Base Hospital. Two others, a civilian fireman and a Navy seaman were overcome by ammonia fumes and smoke which required only treatment at the Base.

The fire at Salt Lake City was of undetermined origin. No estimate of damage was given pending completion of an inventory at the Intermountain Refrigeration Co. The fire began in a small parts shop and spread through two main floor rooms of the two-story brick and frame structure.

Central Auto-plant (cont'd)

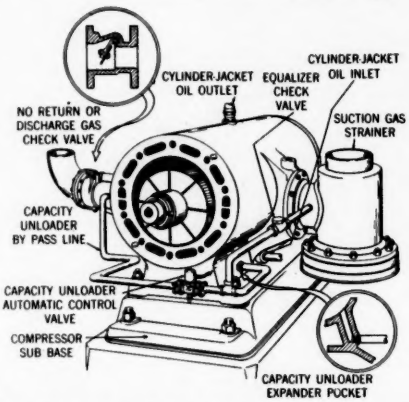

CYLINDER-JACKET OIL OUTLET
EQUALIZER CHECK VALVE
CYLINDER-JACKET OIL INLET
NO RETURN OR DISCHARGE GAS CHECK VALVE
SUCTION GAS STRAINER
CAPACITY UNLOADER BY PASS LINE
CAPACITY UNLOADER AUTOMATIC CONTROL VALVE
COMPRESSOR SUB BASE
CAPACITY UNLOADER EXPANDER POCKET

Fig. 2. Section drawing of the rotary compressors at Central. Insets show built-in check valve feature and capacity control provision.

Fig. 3. Recorder chart indicates constant minus 8 F temperature in warehouse, well below the AFDOUS recommendation of 0 F.

On the brick sidewalls, a 2-in. layer of *Foamglass* in *Enamelite* was laid and this layer was covered by two 3-in. layers of Johns-Manville *rock cork* set in hot asphalt and finished off with plaster. The concrete slab roof is insulated with eight inches of *rock cork*.

The floors were laid in a series of steps. First, a layer of gravel was compacted to provide a firm base and on this layer hollow tile pipe was laid for cross ventilation. Concrete was poured over the tiles, and, when set, was covered with eight inches of *rock cork*. Finally, the floor was finished off with a concrete wearing surface.

Automatic Operation

Central Warehouse has an operating engineer on duty eight hours a day, five days a week. At all other times, plant operation is fully automatic with an ADT system which signals the existence of four unfavorable conditions in the plant. These are: (1) low water to condensers; (2) rising storage room temperatures; (3) excessive ammonia pressure in condensers; and (4) liquid ammonia at the compressors. Any of these unfavorable conditions will impulse the system and an engineer is dispatched to the plant.

The recorder which initiates the alarm impulse for unfavorable condition (2), also furnishes evidence of constant storage temperature so important to frozen food quality (see Fig. 3).

During the intermediate season between fall and winter, the evaporative condensers are arranged to operate dry when the outside air temperature is 40 F or below. An air sensing thermostat cycles the evaporative condenser water pumps. It is not unusual to operate condensers wet in daytime and dry at night, when the outside air is lower in temperature. At the start of the winter season, the operating engineer drains the water from the evaporative condenser and it operates dry continuously.

Industry Meetings

Practical Refrigerating Engineers — **Dec. 9-11**

National Association Of Practical Refrigerating Engineers
Roosevelt Hotel, New Orleans

Maintenance — **Jan. 25-28**

Plant Maintenance & Engineering Show
Convention Hall, Philadelphia

Company Truckers — **Jan. 28-29**

Private Truck Council of America, Inc.
21st Annual Convention
Roosevelt Hotel, New York City

Air Conditioning Exposition — **Feb. 1-4**

2nd Southwest Meeting & Air Conditioning Exposition
Memorial Auditorium, Dallas, Texas

Refrigeration & Air Conditioning Engineers — **Feb. 1-4**

American Society Of Heating, Refrigeration And Air Conditioning Engineers, Inc.
Baker Hotel, Dallas

Poultry Conference — **Feb. 12-14**

Institute of American Poultry Industries
1960 Fact Finding Conference
Municipal Auditorium, Kansas City, Mo.

Practical Refrigeration — **Feb. 26, 27**

Pacific Coast Conference, NAPRE
California Chapter No. 2
Los Angeles, Calif.

Frozen Food Packing — **Mar. 6-10**

National Association of Frozen Food Packers
Conrad Hilton Hotel, Chicago, Ill.

Power Forum — **Mar. 29-31**

Illinois Institute of Technology
22nd Annual American Power Conference
Hotel Sherman, Chicago

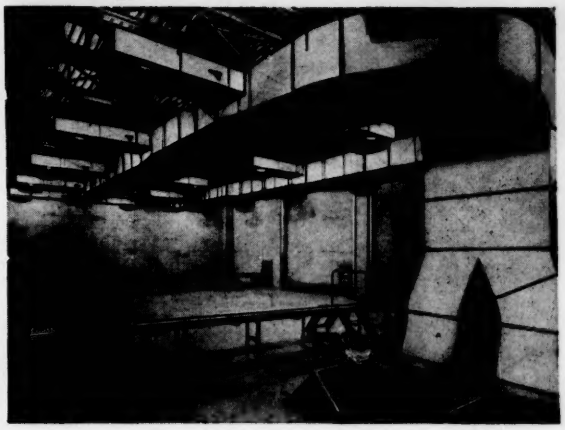
Air Conditioning Conference — **Apr. 27-30**

Western Air Conditioning Industries Assn.
Shrine Exposition Hall, Los Angeles

Meat Packing — **May 12-15**

National Independent Meat Packers Ass'n.
Ambassador Hotel, Atlantic City

King Engineering Report



How to design and locate Sharp Freeze Systems for THE YEARS AHEAD...

At the King Co. system engineering is a science because fifty years of experience has demonstrated that no two plants are exactly alike. King engineers design and locate each unit where it will:

1. not interfere with plant expansion
2. minimize infiltration
3. use least valuable floor space
4. not conflict with other plant operations
5. require lowest installation cost
6. maintain maximum product storage space
7. be readily accessible for maintenance without interruption of cold room operation.
8. provide most efficient combination of above features

Other important considerations are uniform air distribution, and air turbulence without blast effects on the box men.

King engineers are always ready to advise operators of freezer or storage plants on the best procedure for any particular problem. This service is provided at no extra cost to users of King Sharp Freeze Systems.

50 years of experience is at your service

King COMPANY OF OWATONNA
907 Cedar St. OWATONNA, MINNESOTA

NAPRE QUESTION BOX

HAVE A QUESTION? Address it to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif. Answers appear monthly in this department on problems forwarded by NAPRE members. Comments from all readers welcomed.

H. P. Hayes

Dean Hayes Resigns As Question Box Chairman

EFFECTIVE at the annual membership meeting of NAPRE on December 9, is the resignation of Dean Harold P. Hayes as Chairman of the NAPRE Educational Committee and editor of the Question Box of INDUSTRIAL REFRIGERATION. Dean Hayes expressed his regrets at having to withdraw, but pointed out his new duties at California State Polytechnic College made it rather difficult to effectively administer the NAPRE and IR duties.

Dean of the College Now

Prof. Harold P. Hayes was appointed Dean of California State Polytechnic College at San Luis Obispo on March 15, 1959. He has complete charge of all operations on that campus, reporting to Vice-President Robert E. Kennedy and President Julian A. McPhee who administer the Kellogg-Voorhis and San Luis Obispo Campuses of the college.

Dean Hayes' responsibilities now include all instruction in Agriculture, Engineering, Arts and Sciences, plus the operation of the Student Personnel Division and the Business Management Division. A promotion of that magnitude, of course, pre-concluded his continuation for very long in the two positions as NAPRE Chairman and Question Box Editor.

Hayes was succeeded at San Luis Obispo in the College of Engineering, by Dean Lee Osteyee.

Temperature – Humidity Commodity Chart Needed

QUESTION: Some years ago there was a storage temperature-humidity chart for various commodities, published by one of the refrigerating organizations or associations, or possibly by one of the trade magazines in the field. Could you tell me if this chart is still published and where we might obtain one?

–C.W.G., NYC.

ANSWER: Subject references in the technical files of INDUSTRIAL REFRIGERATION indicate that the Temperature-Humidity Chart for Perishable Commodities has gone out of print since the decease of the Author. Just where to find a simplified chart of that nature today is an item of information that many would like to learn. However, an enterprising warehouseman and/or engineer could probably make up his own chart from several sources of such data, listing only those commodities which would most likely be handled in the individual enterprise.

Table A-2 on pages 458 through 461 of BASIC REFRIGERATION by Guy R. King, contains a list of commodities with required storage temperatures and the relative humidity, in addition to a column on the storage life of these commodities. Although the table contains additional data for the refrigeration engineer, this appendix material would be helpful in making up a commodity chart.

Commodity storage requirements are also listed in Section 23, Table 1, pages 23-02 through 05 of the ASRE DATA BOOK, REFRIGERATION APPLICATIONS. If you do not have a BASIC REFRIGERATION book, you can probably take the necessary data from this publication.

–J.R.K.

Too Many Reactors To Suit This Engineer

QUESTION: What is a reactor, and what is the purpose of its use with electric motors?

We became acquainted with the use of the word (reactor) in chemical expressions and most frequently see it used with nuclear physics these days. Now trade publications have taken to use of the word in electrical expressions.

To avoid confusion, couldn't another expression be used?

–E.L.K., Chicago.

ANSWER: Reactor, a term used with alternating current, denotes one of three types of impedance. One type is a resistance, a second is a capacitance and a third is a reactance. A reactor produces a phase relationship 90° out of phase with a resistor and directly opposite to that of a capacitance.

Physically it is a type of coil usually made up with heavy wire which produces a magnetic field opposing the direction of power flow. Its most common use is with reduced voltage type starters when applied on high voltage power systems (2300 volts and above).

During the starting cycle, the reactor is switched so that it is in series with the motor and produces a line voltage drop resulting in a net reduction of system voltage at the motor terminals. The reactor coil in this case carries the same current as does the motor. When the motor switches over to running conditions, the reactor is taken entirely out of this circuit.

Used Also In Generation

A reactor is also sometimes used in series with a connection from the neutral of a generator to a system ground. This is used in order to minimize short circuit currents under certain conditions.

Since electric motors are made up of coil windings, their net impedance is a combination of resistance and reactance. This is the reason that they affect the system phase relationship in such a manner as to produce a lagging power factor.

Capacitors are sometimes put on the line in order to produce a phase relationship such as to give a leading power factor and thus cancel out the lagging effect of the motor reactance.

This term has been so commonly used that I do not think there is much chance of replacing it with a different expression.

–Wm. L. Tiffin, Chicago.

Tunnel Freezing By Birdseye

SOLID BLOCKS of frozen foods won't be so familiar in the days not too far away, said the writer of a Tunnel Freezing article, in GENERAL FOODS NEWS in September 1959. Go anywhere in Birds Eye these days, his sub-head read, and you are likely to hear about tunnel freezing. It is new to most of us, his caption continued, but it's a coming thing!

First To Produce Block Form Of Frozen Food

First reaction of this publication's reviewer was to look back at the date, thinking perhaps a magazine several decades old had reached his desk. Then slowly came the dawn. Birds Eye Div. of General Foods, under the late Clarence Birdseye, were the first to produce the block forms of frozen foods. The tunnel freezers utilizing belt conveyor for bulk freezing probably are new to the younger generations in that establishment.

The article goes on to describe the installation at Walla Walla, Washington which was recently doubled. It also mentions the tunnel facilities of Waseca, Minnesota, being improved with further expansion being studied. Present plate freezing which has been the standard since Birds Eye started the industry 30 years ago is expected to take the back seat to the free-flowing product.

Tunnel Trend Asserted

Here are a number of the reasons for the trend to tunnel freezing, given by the GF NEWS: When a housewife has only two or three people to serve, for example—and family groups have grown smaller over the last 40 years—it's often desirable to split a package of frozen foods. With a free-flowing product, she can pour out just as much as she needs and put what's left back in the freezer for use another day. Solid blocks are not so convenient.

Further, the GF NEWS reported, the flexibility of the free-flowing products is also a big advantage to restaurants and hotels which use the institutional packs.

A third advantage cited by the General Foods reporter were the advantages to production plants too. The tunnel freezing simplifies mixed vegetable production because each variety can be frozen individually and stored in refrigerated warehouses until needed. Later, the loose vegetables can be mixed while still frozen.

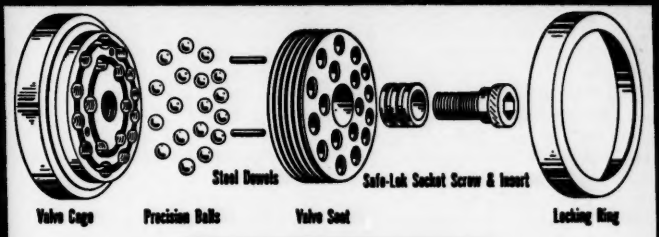
Bulk Freezing Advantages

There is still another production advantage to tunnel freezing. Sometimes (it happened this past summer) due to unexpected weather conditions, the harvest of a particular vegetable exceeds expectations. Although the processing plant operates around the clock, it cannot handle the volume, and spoilage is threatened.

Here, tunnel freezing comes to the rescue. After a quick run through the tunnel, the loose vegetables are stored in large bags lined with polyethylene until they can be packaged, or in some instances, until they are needed to meet sales requirements.

The 2-page report concluded that although Birds Eye has so far limited its tunnel freezing to vegetables, it may go into the tunnel freezing of fruits and other foods as well. But just how soon—and to what degree—is still to be decided. But one thing is sure: Birds Eye people are giving tunnel freezing a close look.

You Can See The Difference!!!



BALL VALVE

TOTALLY UNLIKE ANY OTHER VALVE

Will Increase Performance of ANY Compressor!

For: Y-6½ x 6½

For: Old Style 9 x 9

For: Old Style 12 x 12

- 26% to 80% More Gas Passage
- Less Resistance
- Standardized Assemblies for Most Compressors
- Easy to Install
- Better Seating—Longer Life
- Eliminates Valve Failure or Breakage
- Discharge and Suction Valves in Stock for More Than 100 Different Compressors
- Immediate Shipment

For information on improving performance of your compressors, send us the name, bore, stroke, speed and serial number of each machine.

BALL VALVE COMPANY

P.O. BOX 118 • NEODESHA, KANSAS

Fiftieth Anniversary Preveiws:

Van J. Sparks

After finishing East Central State Teacher's College, Van J. Sparks became manager of Paul's Valley Ice and Fuel Co., Paul's Valley, Okla. Resigning two years later, he took over the management of the ice plant of Missouri Power and Light Co., Kirksville, Mo., and subsequently resigned that position to go with the Frick Co.

Manager of their Oklahoma City office from 1930 to 1934, he then headed Frick's middle western office at Kansas City until 1959. During this period, he helped organize and direct 12 different corporations, all in dry ice, cold storage, frozen foods, insulation contracting, engineering consulting and contracting, and valve manufacturing. Sparks patented ball valves in 1956, and took over management of the Ball Valve Co. in March 1959.

Joseph W. Slavin

Joseph W. Slavin was born February 8, 1927 in Boston, Mass. and was educated at U. S. Merchant Marine Academy, Kingspoint, Long Island, New York, B. S. 1948. He was formerly Mechanical Designer with Stone and Webster Engineering Corp., 1951 to 1954; Mechanical Engineer, U. S. Fish and Wildlife Service, 1954 to date.

Slavin is author and co-author of numerous government and journal articles on the freezing and refrigeration of fish and fishery products. He is an associate member of ASHRAE; also a member of New England Fisheries Technologists. At present, he is Assistant Director, Fishery Technological Laboratory, U. S. Bureau of Commercial Fisheries, East Boston.

Joseph R. Chamberlain

Manager, Product and Application Engineering Department, York Div., Borg-Warner Corp., York, Pa. since Oct. 1958, Joseph R. Chamberlain received his A. B., Duke University, 1925; M. E., Cornell University, 1938. He joined York Corp. as a student engineer in 1928 and has since served in various capacities in Engineering, including that of Chief Engineer, Industrial Div.

Mr. Chamberlain has been active in various industry associations, including ARI committees, and is presently Chairman of the ASA B9 Safety Code for Mechanical Refrigeration Interpretations Sub-Committee, and Vice Chairman of the ASA B31.5 Committee to formulate an American Standard Code for Refrigerant Piping. He has authored numerous articles for the trade press and is a Registered Professional Engineer.

Advance Look at the NAPRE Convention

▶▶▶OPENING ITS 50th Anniversary celebration at New Orleans on December 9 is the National Association of Practical Refrigerating Engineers. Meeting at the famous Roosevelt Hotel, the engineers' group will launch a one-year celebration to close about December, 1960.

Actually the NAPRE was born on January 10, 1910, at Texarkansas, Texas, when a provisional association was formed. Operating engineers in Texas, Louisiana, Mississippi and Arkansas had met in 1909 but the idea bore fruit first at the January 10 gathering. The Refrigerating Engineers of America became the NAPRE on December 1, 2 and 3, 1910 at the first convention held in Simon's Hall, Shreveport, La.

The three-day meeting in New Orleans this year features five educational sessions, presenting 14 speakers. Two sessions each will be held Wednesday and Friday, and one on Thursday. As is customary with the NAPRE, the mid-meeting day will feature a "postman's holiday". On Thursday, December 10, the delegates and guests will visit New Orleans Cold Storage Co., Ltd. There, Host H. L. "Jimmy" Brooks, Pres. & Gen'l Mgr. will review the principal functions of the public refrigerated warehouse and its contribution to the health and welfare of the community. Features of the plant were described in INDUSTRIAL REFRIGERATION pages 30, 31, 32, November 1959.

Educational Dividends

Throughout the three-day meeting the engineers will find the welcome mat out at the Delgado Trade School in New Orleans. This division of the Crescent City's school system specializes in adult technical and vocational training. They are known for their contribution to apprenticeship training. Director of the school is Marvin Thames.

New Orleans new $25 million dollar Civic Center will also have its plants open to the NAPRE delegates. Huge air conditioning plants in the Public Library and Civil Courts Building will host the engineers at any hour of the business day. City Hall and it's air conditioning plant was described in the October INDUSTRIAL REFRIGERATION pages 35 and 38. The visitors from the NAPRE convention will be interested in the central data section from which another plant can be supervised.

Engineers can record the temperature of 78 locations in the building by touching a push button which also indicates the temperature at the moment. A smoke detecting system is employed and a flashing light on the supervisory data panel alerts the engineer who can investigate and warn of a fire hazard. The control station was installed at a cost of $40,000.

The operating plant for the City Hall employs a crew of five engineers, four maintenance men, one laborer, one repairman, one electrician and his apprentice, and one plumber.

(Continued on Page 32)

James R. Harnish

After serving in the U. S. Navy in 1945-46, James R. Harnish received his B.S.M.E. in Mechanical Engineering from the University of Oklahoma in 1951. He joined York Corp. in 1951 and completed an 18-month engineering training program, then joined Applications Engineering Dept. and later the Product and Application Engineering Dept.

His work activity has included refrigerant piping, controls, air conditioning systems, low temperature systems, and factory assembled, pre-engineered and custom-built heat pump systems. He is a member of ASHRAE and ASME. Author of a number of papers on heat pumps, refrigerant piping, low temperature systems and system applications, he has also presented technical papers on similar subjects before various local and national technical societies.

O. I. Powell

Graduated from Drexel Institute of Technology in 1934, Mechanical Engineering, O. I. Powell has also done graduate work in Engineering Economics at Stevens Institute. From 1934 to 1940 he was employed by the Hoffman Beverage Co. in Newark, in connection with design and plant engineering of a new brewery and carbonated beverage plant.

For two years he was a design engineer on refrigeration, air conditioning and process equipment for Agfa Ansco Div., General Aniline and Film Corp. In May 1942 he entered the U. S. Army and returned to inactive duty in 1945 with the rank of Major. On separation from service, until 1948, he was with the Brewing Corp. of America in Cleveland as Director of Engineering, leaving to go with the architectural engineering firm of Geo. S. Rider Co., Cleveland.

Wallace M. Smith

Wallace M. Smith put together more than 20 years of experience which eminently qualified him for this presentation. Prior to his present association, he spent five years as a refrigeration service engineer, four years as a sales engineer in refrigeration and air conditioning, four years as a refrigeration and air conditioning contractor and six years as an instructor at Oklahoma City University in refrigeration, air conditioning and heating. He is employed by the General Chemical Div., Allied Chemical Corp., as a refrigeration technical serviceman in the Genetron Div.

Since June 1952 he has been Director of Engineering for the Carling Brewing Co., Cleveland and was promoted to Vice President in charge of engineering in May 1956.

BASIC REFRIGERATION

By Guy R. King

The Book

of

"Refrigeration Knowledge"

29 Chapters—340 ILLUSTRATIONS—526 PAGES COVERING THESE SUBJECTS

- Fundamentals
- Compression System of Refrigeration
- Refrigeration
- Expansion Valves
- Evaporators
- Compressors
- Condensers
- Flow Equipment
- Electric Controls and Control Valves
- Lubrication
- Defrosting Methods
- Compressor Drives
- Food Preservation
- Operating
- Servicing
- Refrigerated Enclosures
- Instruments and Meters
- Heat Calculations
- Humidity in Refrigeration
- Compresser Calculations I
- Compresser Calculations II
- Refrigerant Lines—Pressure Drops
- Brine in Refrigeration
- Liquid Cooling
- Complete Systems
- Carbon Dioxide—Dry Ice
- Altitude and Its Effect
- Absorption Systems
- The Refrigeration Code

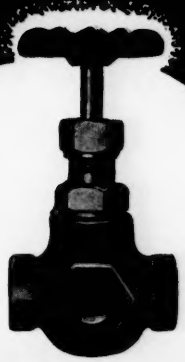
Send For This Book—$6.00

NICKERSON & COLLINS CO.

433 N. Waller Ave., Chicago 44.

Efficient Designs For Long Life And Low Maintenance

SHANK AMMONIA VALVES



Shank Valves have earned a reputation for high quality, long life and dependable products.
Built of highest grade materials with close tolerances—will stand most rigid inspections.
Largest line of Ammonia All-Steel Bar Stock Valves in the industry.
Completely Cadmium plated.

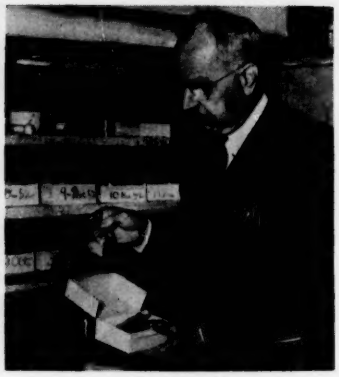
STOCKED BY LEADING JOBBERS

- Shut Off Valves
- Line Valves
- Three Way Valves
- Gauge Sets
- Relief Valves
- Expansion Valves
- Steel Purge Valves

Write for Catalog

CYRUS SHANK COMPANY

4652 West 12th Place, Chicago 50, Illinois



E. A. Fieger

Born May 16, 1897 in St. Paul, Minn., Dr. E. A. Fieger received the Ph.D. degree in 1924 from the University of Minnesota. In his professional career, he has been a member of the teaching staff of Louisiana State University since 1924. In 1944 he was appointed Head of the Department of Agricultural Chemistry and Biochemistry, which involves administrative, teaching, and research duties. His research interests at the present time are investigations of factors affecting the quality of shrimp

William H. Russell

After completing high school, William H. Russell was accepted by the Educational Dept. of Westinghouse Electric Co., Pittsburgh, Pa. for their technical training program. While receiving this training, he attended night classes in mechanical and electrical engineering at engineering colleges in Pittsburgh.

Mr. Russell is a registered mechanical and electrical engineer and has been designing central air conditioning systems since 1936. He has also been operating superintendent of a central station system of 9,000 tons capacity. He is presently Chief Engineer with the firm of Leo S. Weil & Walter B. Moses, Consulting Engineers of New Orleans, La. and St. Louis, Mo.

Raymond C. Ellis, Jr.

Raymond C. Ellis, Jr. has been associated with the National Safety Council since 1955. He serves as Senior Engineer in the Training Division of the Industrial Dept. with staff representative assignment to the Food and Beverage Section and Trades and Services Section.

Prior to joining the National Safety Council, he was associated with Marshall Field & Co. in Chicago. He held a variety of assignments including Workroom Personnel Director, Warehouse Group Operations Manager, Operating and Delivery Service Personnel Director and Safety Director for three years prior to resignation to serve with the Council.

He has studied at the University of Chicago, Northwestern University and Ohio State University. He is a member of the Greater Chicago Chapter of the American Society of Safety Engineers and the Newcomen Society of North America.

NAPRE Previews (Continued)

Selected Summaries

Opening the engineer-education sessions is a panel on reciprocating compressor valves. Joseph Raufeisen, chief engineer, Refrigeration and Air Conditioning Department, Bell & Gossett Company; Van L. Sparks, president and general manager of the Ball Valve Co., and E. D. Lindsley, service engineer, Worthington Corp., are the panelists.

"It is the aim of every valve designer" said Van J. Sparks of the Ball Valve Co., "to produce valves which are quiet, efficient, free from leakage, serviceable, long lasting and at acceptable prices. There are limitations, but when the designer stays within these rather wide limits, a valve gratifies its user.

"Ball valves are a recognized success. There are many thousands of them in operation in most all types and kinds of compressors, pumping air, ammonia, halogenated refrigerants, CO_2,natural gass and methanol synthetic gas. Most of these are in refrigerating machines, operating in the industry's normal range of pressures, speeds and temperatures. However," Sparks noted, "some are in machines outside the refrigeration industry operating in a range of 1800 psig suction, 5000 psig discharge.

"Balls are inherently good for this service," he said. "The sphere offers little resistance to the flow of gas. Because a ball is the most compact mass possible, there can be no flexion, consequently no breakage from fatigue. Balls are among the most perfect things manufactured, having a sphericity of .00025-in. Although designed to carry heavy loads, the demand on the balls is negligible in valve service, with the balls moving a small fraction of an inch, opening and closing ports. Seldom does a ball lift more than 1/16-in, usually less.

"Limits of ball valve applications will be widened when a light ball is produced which meets all the other exacting requirements," this designer said. "So far, none of the plastics have proved satisfactory for the normal discharge pressures and temperatures. Until satisfactory light weight spheres (for low impact) are available, ball valves will probably be limited to the heavy duty compressors where there is always ample thickness for caging and seating the steel balls.

"Ball valves will fit more than 125 different compressors, but none are produced for situations where there is the slightest question that another type might be more suitable", he concluded.

Jacketed Freezer Rooms

Serious consideration is often given to temperatures that will be maintained in the refrigerated warehouse; but, how much consideration is given to the maintenance of relative humidity? Many warehouse operators do not know the relative humidity in their particular cold store. Questions concerning this subject are often put aside by saying, "Well, I put in as much pipe surface as was economically possible".

Many researchers have shown that a high relative humidity is important, particularly for the storage of unpackaged products such as fish and meat. Various refrigeration techniques have been studied in order to arrive at a practical method of creating a high humid environment. A jacketed freezer capable of maintaining relative humidities of over 90 percent shows considerable promise in this regard.

In his paper, Jos. W. Slavin. U. S. Bureau of Commercial Fisheries, describes some of the commercial and experimental jacketed freezers that are now in use in Russia and other countries. Extensive tests conducted on a jacketed freezer at the Bureau's Technological laboratory in Boston

(Continued on Page 34)

Guy R. King

Graduated from Stanford University in General Engineering in 1920, Guy R. King immediately started post graduate work in the same field. In 1928 he went to work for the Street Lighting & Equipment Co. of San Francisco. Early in the 1930's, he gained practical experience in the General Electric refrigerator rebuilding factory in San Francisco, and in 1935, he started teaching refrigeration and air conditioning at Heald's Engineering College, San Francisco. At the same time, he joined the San Francisco Chapter, NAPRE. In 1939 he began a career as an operating engineer, instructing part time as well.

In 1941 he went into the Shipbuilding Div. of Bethlehem Steel Co., San Francisco and became the instructor for California Chapter No. 1, NAPRE. In 1946 he affiliated with the Ralph E. Manns Co., refrigeration contractors, but returned to teaching full time in 1947 at Laney Institute. Later that year, he moved to Honolulu to teach refrigeration and air conditioning, electricity and mathematics at a private school, and returned to the mainland in 1950 in a similar teaching position at Santa Monica Junior College. His book, BASIC REFRIGERATION, was published in 1951. In 1959 he was president of California Chapter No. 2, NAPRE at Los Angeles, his second term as a chapter president, having served as president of California Chapter No. 1, in 1945.

R. E. Zach

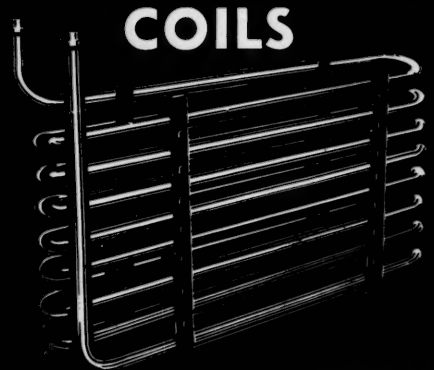
Assistant NAPRE Educational Chairman, Richard E. Zach, is an instructor of mechanical engineering, University of Wis., Madison, Wis. Zach has specialized in refrigeration, air conditioning and thermodynamic subjects. While at the University, he has been completing graduate work toward a Master's degree in heat transfer. He is a graduate of U. of Wis. From 1952 to 1957 he was a project engineer for York Corp.

Ed. L. Nelson

At present, Ed L. Nelson, is Chief Engineer, Southern Div. of the Union Ice Co. in Calif. Responsible for all ice making, cold storage and freezing plants in southern California, Nelson has been employed by the Union Ice Co. since May 1925. He attended the College of Engineering, University of California at Berkeley studying civil and mechanical engineering subjects. He holds three State of California professional engineer licenses; namely, mechanical, civil and structural registrations.

Questioned concerning the short bibliographical sketch he submitted, Nelson replied that he did not know what he might add other than he does not happen to be a golfer, is an occasional drinker and has a hobby of photography covering land, aerial, under water and cheese cake fields. Since photography is his hobby, he naturally makes his own Christmas cards and friends recall Nelson's trimming a Christmas tree underwater off Catalina in 1958.

REFRIGERATION COILS



For over 75 years, NATIONAL REFRIGERATION COILS have been known for their smooth bends, perfect welds and accurate measurements — results of experienced engineering and exact production. The same effective service is guaranteed in all types of NATIONAL COILS, HEATERS, CONVEYORS & HEAT EXCHANGERS.

NATIONAL QUALITY NATIONAL PIPE BENDING CO.

162 RIVER ST. • NEW HAVEN CONN.

K. G. BROWN

CAN

MODERNIZE YOUR OUTDATED

ICE VENDING STATION

. . . WITH THE NEW MULTI-SCREW, PATENTED VENDOR!

BRING YOUR PRESENT ICE STATION UP TO THE MINUTE AND MAKE IT MORE PROFITABLE, LESS TROUBLESOME . . . WITH THE RADICALLY NEW KG BROWN AUTOMATIC VENDING MECHANISM . . . AS USED IN ALL NEW BROWN STATIONS.

#1 DOUBLE YOUR VENDING CAPACITY
#2 INCREASE YOUR STORAGE SPACE
#3 SLASH MAINTENANCE COSTS

WRITE . . . WIRE OR PHONE . . . NOW

K. G. BROWN MFG. CO., INC.
WICKHAM AVE., MATTITUCK, N. Y.

NAPRE Previews (Continued)

are detailed and discussed. Information is given on the effect of equipment operation on relative humidity and operating costs. The advantages and disadvantages of this freezer are also outlined, particularly in regard to improved retention of quality during frozen storage.

Compressor Oil Control

Two speakers tackle the very difficult topic of control of oil in refrigeration systems. They are J. R. Chamberlain and J. R. Harnish, of York Division, Borg-Warner Corp. Their paper describes compressor lubrication problems, efforts to minimize oil pumping rates, and types of separators used to minimize the quantity of oil reaching the evaporator.

Refrigerant Compatibility

Slides are used by the two speakers to illustrate different methods used to return oil from the evaporator to the compressor. Physical characteristics of compressor lubricating oils is discussed and the phenomena of refrigerant absorption by oil demonstrated.

Sludge Analysis

W. M. Smith, Technical Service, General Chemical Division, Allied Chemical Corp., describes his paper as an attempt to help the engineer recognize and analyze different types of contaminants in systems. Sludge is one of the most serious causes of operating problems and breakdowns in refrigeration systems. Interpretation of test results, sources of contaminants, and a brief discussion of clean-up procedures are part of the paper.

New Plant Facilities For Brewing Industry

Engineering is becoming a more important department in larger operating and processing companies. The plant engineer in larger enterprises is even designated an officer of the company. O. I. Powell of the Carling Brewing Company highlights the duties of the executive engineer in his paper, Design and Construction of New Plant Facilities in the Brewing Industry.

Considering company growth first, Powell describes the need for plant expansion and a theory of decentralization. Determination of location, economic factors, design requirements and marketing potential are the four considerations for branch plant construction.

From there Powell launches into the selection of a plant site, its considerations and purchase procedures. First consideration is the selection of the architect and engineer.

This vice-president for engineering then delved into the preliminary design. He shows how process flow sheets are developed and how such basic equipment as a steam plant and refrigeration system are sized. Provision for expansion, plant layout and a preliminary estimate complete the preliminary projects. Next, Powell shows how plans and specifications develop, how a final estimate is obtained and how it is adjusted to the budget.

Engineer Contracts Work

The contract is becoming more the responsibility of the engineer. The speaker discusses the number of major contracts, forms, selection of contractors for a bid list, bidding procedures and award of contracts.

Next the speaker deals with construction; how the field organization is set up and progress is scheduled, the financial control and completion.

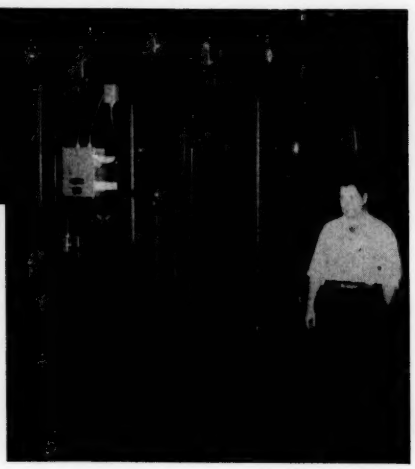
Highlights of start-up procedure are touched upon, such as personnel selection and training schedules. Organization of the various offices, equipment tests, initial order of supplies and accessories, trial operations and adjustments are covered. Also included are production operations, quality control, cost control and budgets, and full scale production. Concluding, Powell cites an example of evaluation of new plant operation in comparison with existing plants, and describes how design and construction critique is accomplished.

New Absorption Systems

An analysis of a typical lithium bromide cycle for an absorption refrigeration system is discussed by R. E. Zach, Refrigeration Instructor, University of Wisconsin, Madison. Zach who is also chairman of the NAPRE Educational Program for this meeting, presents a paper which deals with the practical analysis of such a system.

The cycle is applied to chilled water for air conditioning purposes, with steam as the heat source. The necessary data for determining heat transfer and methods of heat transfer will be discussed, in order to give the practical refrigeration engineer a better understanding of the

THE ULTIMATE IN THE COMPRESSION REFRIGERATION CYCLE*



THIS IS ANOTHER CYCLE CENTER, factory assembled and on its way to a 150 ton poultry freezing plant.

What will it do?*

It will provide liquid overfeed to the evaporators, catch the excess liquid and recirculate it to the evaporators, with these results:

- FULL COMPRESSOR PROTECTION AGAINST SLUGS
- PEAK COIL AND COMPRESSOR EFFICIENCIES
- SUB COOLED LIQUID FEED AT CONSTANT PRESSURE THE YEAR AROUND
- PRACTICALLY UNLIMITED RATE OF LIQUID FEED AT ABSOLUTELY NO POWER COST
- NO MECHANICAL PUMPS
- NO FLASH GAS IN LIQUID LINES
- SAFE, AUTOMATIC PLANT OPERATION
- OIL SEPARATION, ANY REFRIGERANT
- HIGHER SUCTION PRESSURES
- LARGE POWER SAVINGS
- LARGE SAVINGS IN FIRST COST ON NEW PLANTS. FOR EXAMPLE, THE RECEIVER IS NOT REQUIRED AND SURGE DRUMS ARE ELIMINATED.
- AUTOMATIC HOT GAS DEFROSTING AT MINIMUM COST

ASK FOR BULLETIN CC-2

*** NOT JUST A LIQUID RETURN UNIT.** Available for any refrigerant, in capacities from 10 to 1,000 tons and more. Factory assembly is optional.

J. E. Watkins Co.
307 LAKE STREET, MAYWOOD, ILLINOIS

operation of the absorption system. Important factors such as vapor pressure, percent concentration, maximum solubility or crystalization point, specific heat, heat of solution, viscosity and thermal conductivity of aqueous lithium bromide solutions are explained in detail.

A comparison between the economic performance of the lithium bromide absorption system and that of the vapor compression system are presented along with a brief discussion of the operation and maintenance of such a system.

Freezing Shrimp For Frozen Storage

Quality of a frozen food product is largely a reflection of its prefreezing handling and processing, said Dr. E. A. Fieger, Head, Department of Agricultural Chemistry and Biochemistry, Louisiana State University, Baton Rouge, Louisiana. Therefore he describes the method of catching shrimp, how they are handled and stored on trawlers and how changes in these operations effect the quality of both fresh and frozen shrimp.

The method of unloading and handling in fish receiving houses for transhipment is given. The talk is concluded with a discussion of the freezing of shrimp and the effect of packaging, glazing and storage temperatures upon quality.

Central Station System For Air Conditioning

Present and future central station air conditioning systems are outlined by W. H. Russell of Leo S. Weil and Walter B. Moses, consulting engineers, New Orleans. After a brief history of central station air conditioning, Russell launches into a comparison of central station and multiple systems, comparing initial cost, power and maintenance costs, space requirements, and adaptability to exchange and expansion.

Graphic Controls

Third part of his talk is a description of the typical central station system, giving the general scheme and including steam generation. Emphasis, of course, is on chilled water generation and plant auxiliary, although distribution of both steam and chilled water is covered. Graphic controls, electrical installation and power requirements, plus provisions for expansion are included.

Operating procedures and maintenance receive equal emphasis. Operating schedules in the typical plant, delineation of responsibility and suggestions for similar plants are offered. Maintenance schedule for a typical plant, file and visual control and other comment are offered by the author. Future predictions for larger central station systems by this speaker included: probable greater use of high temperature for heating, gas turbine drives for centrifugals with utilization of waste heat, telemetry and automation.

Safety—Natural and Vital

Raymond C. Ellis, Jr., staff engineer of the National Safety Council, has a dual assignment in his speaking engagement. In addition to a practical safety talk, the NAPRE officers asked that he address the delegates on the value of Safety Council membership for the Association. Ellis introduces his topic by asking the question "What Now?"

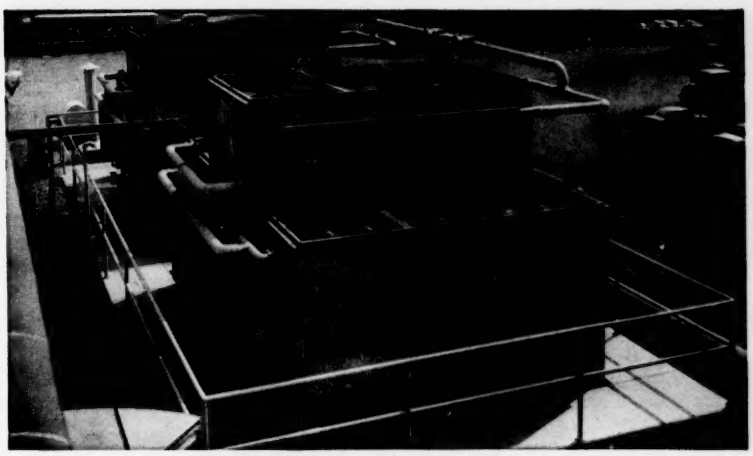
The measure of success of the practical refrigeration engineer is to be found in his reply to the question "What Now?" The question might even be turned to read, "Now What?" Where safety has been an important part of the planning, doing, and follow-through on a job, the engineer has had a better opportunity to complete the assignment accident-free and without damage to equipment or others. The practical refrigeration engineer has reached for, "a bit of the wisdom of Solomon" when he consciously determined that safety is just good business.

In a world where communications are so vital; and where lack of communications have resulted in international and local misunderstandings, safe practices not only mean the safe way, but also the only right way. This communication of safety reaches far beyond the job situation, too. How the engineer drives and how safe a home his family maintains are vital for the practical man's realization that safety is the way of life. Ellis concludes that safety is as natural and as vital as breathing.

Engineer Technician

It has always been the duty of the practical refrigerating engineer to operate his plant in such a way as to obtain required conditions at peak efficiency. This always did require a great deal of "know how", Guy R. King, author of Basic Refrigeration, and assistant educational chairman, NAPRE, tells the delegates in a prepared message delivered by L. H. Benedict of Los Angeles. (King was inadvertently detained.)

(Continued on Page 36)



MODERN NIAGARA CONDENSERS PAY FOR THEMSELVES IN EXTRA SAVINGS

These Niagara condensers are lower in first cost and assure you of trouble-free automatic refrigeration. Special features: "Aeropass" coil removes super-heat to give you condensing at lower temperatures and prevent loss of capacity by the scaling of condenser tubes; "Oil-out", oil separator between pre-cooling and condensing coils gives you always an oil-free system; "Panel-Casing" construction gives you access to every part of the condenser for inspection and maintenance. Operating engineers say these condensers "save half the work of running a refrigerating plant". Managers who know costs and profits prove that Niagara condensers bring them great returns in power savings, water savings and reduced maintenance expense.

Write for Bulletins 131 and 142.

NIAGARA BLOWER COMPANY

Dept. IR-12, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Book Review:

CHEMISTRY MADE EASY $10.00
Chemical Publishing Co. Inc.

WELL-ROUNDED as a man might be in experience and education, to make further progress in (or even to keep abreast with) this advancing technological age, he soon finds that a fundamental knowledge of chemistry is essential.

Whether the reader be a practical engineer, a process supervisor, production superintendent or a refrigerating enterprise executive, a basic knowledge of this science is helpful to: a better appreciation for characteristics of today's refrigerants; fair understanding of toxic hazards with various processes; some general idea of the composition of new materials being marketed (for example, the new plastics); and quick comprehension when conferring with subordinates on more technical matters.

CHEMISTRY MADE EASY, by Snell and Snell, may be just the text for rounding-out the chemical science back-ground of refrigerating and air conditioning people. Here is what INDUSTRIAL REFRIGERATION reviewers had to say about this new thoroughly revised single copy version of an original three-volume work:

Not Many Will Study —But They Could

"I like CHEMISTRY MADE EASY," wrote the Utilities Engineer for one of the world's largest brewers. "There are some things about it that I do not like, but I admire the authors and their effort. It is written for the most part clearly and simply, for the student rather than the scholar. It is intended to be a home study text, and I think that a person without a previous background of chemistry could get a basic knowledge of that science by systematic study of the book. Not many would, but they could.

"I know practically nothing about either authorship or publishing, so I am presumptuous to criticize any book. But who lets his own ignorance keep him from finding fault with others? In this book, I think that the authors have done their own job quite well. Most of the faults I find seem to be in the editing.

"In the foreward it is admitted that 'without many hours of careful study no satisfactory results can be obtained'. Many hours of careful study may be interesting, but they will not be easy! Therefore, I think that the book should have a better title.

"The authors say on page 7 that 'mass means the same as weight'. It would be proper to say that the distinction between mass and weight has little significance to the average man, but it is misleading to the student to say that they are the same.

"Chaper XVIII, Part I, is a good discussion of pH value, except for the first paragraph. The use of the term 'how much' is unfortunate, as pH value is primarily a measure of 'how active' rather than 'how much'. The authors do relate pH value to activ.., and their meaning is clarified later on, but the first paragraph is likely to be misinterpreted."

Supervising Engineer Finds Text Practical

Another reviewer, supervisor of buildings and motor equipment for nearly 30 Chicago installations, had this to say about the text:

"Operating and maintaining plant equipment has developed into a production line technique. An operator of any good plant today has to judge, select and quickly use many 'sure-shot' cures such as fuel oil treatment, water conditioning, scale removal solutions.

Practical Man Avoids Topic For No Sound Reasons

"To do a good job a man must have an understanding of what he is trying to accomplish in order to save his time and his company's money. A basic understanding of chemistry has always been a sort of mysterious mumbo jumbo to the operating engineer and many of his bosses. Sad to say, the average practical man has stayed away from it.

"The market is loaded with chemistry text books which discourage and lose the average practical man. CHEMISTRY MADE EASY should have a great appeal to plant operating personnel.

"Presentation and style makes the book very easy to read and the subject matter is clearly explained. The chapters dealing with Solutions, Acids and Alkali, and the pH Value of Solutions, are very good. Much of the subject matter is brought down to earth and given a practical application."

NAPRE Previews (Continued)

Most of the adjustments necessary to operate a plant have been taken over by automatic controls of increasing complexity. Most of the records of this operation have been taken over by complex recording devices. Maintenance now means keeping this control and recording equipment, as well as the rest of the plant, in tip-top condition. Troubles should be found before they interfere with plant performance. If safety controls should stop a plant, the refrigeration engineer must know how to trace the trouble, correct it, and get the plant operating again with a minimum loss of time.

Broad Technical Knowledge

All this, but most particularly modern control systems, requires a knowledge of more than the engineer can see or feel or smell. A broad technical knowledge is required by the engineer. He must know a lot more of the "why" and "how much" as well as the "how". This is the kind of practical refrigeration engineer our modern plants require, said King.

More Floor Heaving

Typical of NAPRE educational chairmen of the past, Zach also proved resourceful in having a stand-by speaker from among the membership. E. L. Nelson, chief engineer, Southern Division of Union Ice Company was the "ace-in-the-hole". Nelson is the author of "Freezer Room Construction Problems" which described floor heaving conditions in a number of plants and the remedies adopted. Nelson brought with him to the convention a number of case stories since his original paper in 1950. He reviewed these specific projects, citing the damage done, the probable causes and the remedial steps taken. His paper, while scheduled as a stand-by feature at the Fall meeting, is billed as a feature for the Southwest Regional Conference of NAPRE to be held in Los Angeles February 28 and 29, 1960.

What's New

(Continued from Page 8)

to the general offices were run along the overhead in a process rubber storage area. The dripping water made a major traffic aisle slippery, fell on the stored material and on a portion of a conveyor.

To prevent vapor from forming on the outside of the chilled water lines, flexible, foamed plastic *Armaflex* was applied to the lines within the dotted area in the photograph. This application effectively stopped condensation in this high humidity area. Since no additional vapor barrier was needed, installation time was cut considerably. Flexibility of the material allowed it to be bent around fittings.

More On Insulation

▶▶THERMAL INSULATION in East Africa is probably most noticeable by its absence. This statement may be an exaggeration, wrote F. E. Dean, Consultant to the East African Industrial Research Organization. However, there is sufficient truth in it to make the subject of thermal insulation worthy for consideration by American manufacturers, as well as those in Europe.

Dean is trying to persuade the Africans that there is probably no other single factor which can produce greater savings than efficient insulation. In an article written for BUILDING IN EAST AFRICA, he points out that insulation is easily and quickly applied without interruption to plant operations, and it is relatively inexpensive.

In very low temperature applications, he points out that the most common insulation in Africa is cork, which until very recently has been most universally used. Other material now being introduced are the foamed ebonites and the newer rigid plastic foams. He sees an advantage in the latter since they are shipped to Africa as liquids and cast to shape on site, greatly reducing freight costs and damage risks.

(Continued on Page 38)

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

Position and Help Wanted

REFRIGERATION SALES ENGINEER

Rapidly expanding, well established West Coast industrial refrigeration manufacturer has excellent opportunity for aggressive sales engineer. Must have engineering degree or equivalent; minimum of three years refrigeration sales engineering experience in quick freezing, cold storage and process refrigeration. Most important, must be aware of dynamic potential of the industrial refrigeration industry. Excellent salary and commission; outstanding company benefits; car allowance and expenses. Send detailed resume to C. R. Kohlenberger, president.

KOHLENBERGER ENGINEERING CORPORATION
1600 W. Commonwealth Ave. P.O. Box 432
Fullerton, Calif.

USED EQUIPMENT—wanted & for sale

FOR SALE—50 new 400# galvanized 14 ga. welded ice cans, 11½x22½x58" inside dimensions. L. V. Fleiter Co. Inc., 3516 Rutger St., St. Louis 4, Mo., PRospect 2-2778.

FOR SALE—Goebel Brewery, Muskegon, Mich., closed, offers late model first class equipment including York 7½ x 7½ compressor with Westinghouse 40 h.p. 60 cycle, 440 volt 3 phase; York 8 x 8 model DC with G.E. 60 h.p.; York 9 x 9 Model DC with G.E. 70 h.p.; these last two completely overhauled in 1956 a few months before the plant closed; ammonia receiver, oil trap, shell and tube ammonia condensers, retubed in 1956; deep well pump, thousands of feet of 2" galvanized ammonia pipe, individual room coolers and diffusers etc. Write for free catalog to Maurice Osterman, Chas. S. Jacobowitz Corp., Dept. IR, 3080 Main St., Buffalo 14, N. Y., Phone AMherst 2100.

REFRIGERATION EQUIPMENT FOR SALE
Advise Us Your Needs
Use QUICKSEAL—stops brine tank leaks.
Use CLERTEMPICE—clears and tempers ice.
Born Company 80 East Jackson Boulevard.
Chicago 4, Illinois. WAbash 2-3299.

FOR SALE
9x9 York duplex, 200 h.p., 360 r.p.m.
(2) 1½ h.p. ammonia cold air diffusers.
9x9 York and 7x7 Frick compressor.
(2) 8½ KW electric machinery M.G. sets.
30 ton York ice making plant.
JOHN F. CARSON
A & Venango Sts., Philadelphia 34, Pa.
GArfield 6-2221

FOR SALE—Worthington Model ECZ-501, 40 ton evaporative condenser two years old; Two Carrier 7½ h.p. 440 volt, self-contained methyl-chloride compressors; write for complete listing of other compressors last used for air conditioning in Western New York plant including two Worthington Y model methyl-chloride compressors 60 h.p. each. Immediate delivery of tremendous bargains. Write Mr. M. Michaels, Main St. at Lisbon, Buffalo 14, N. Y.

WANTED — 360 ice cans, 400 pound, 11 x 22, with or without grids. Write full details to Box OT-3, % Industrial Refrigeration.

WANTED—Used compressor with motor and starter; about 360 r.p.m. Phone or write Independent Ice Co., 602 N. Albany Ave., Tampa, Fla.

Wanted—evaporative ammonia condenser, 70 to 80 ton refrigeration capacity. Send description of make, age, price and location to North Pole Ice Co., 607 Monticello Ave., Clarksburg, W. Va.

WANTED — Used ice plants, all sizes, either complete or component parts. Quote prices loaded on cars only; itemize, giving size, horsepower, etc., with statement on condition. Address Box OT-4, % Industrial Refrigeration.

WANTED TO BUY—2 sand and gravel water filters, capacity 100 ton ice plant. 1 lime mixer equipped with solution pump and reduction drive, capacity 50 to 100 ton ice plant. Beard Ice Co., 46-48 College St., Danville, Ill.

WANTED—We will pay cash for late model refrigeration equipment including evaporative condensers, compressors, shell and tube condensers, receivers, diffusers, etc. What have you for sale? For more than 45 years we have been of service to the processing indutries. You will be pleased with the manner in which we do business. Whatever you have for sale or whatever you would like to buy "Come to Headquarters"! Charles S. Jacobowitz Corp., Dept. IR, 3080 Main St., Buffalo 14, N. Y. Phone AMherst 2100.

FOR SALE—Chrysler 100 ton Air-Temp condensing unit, Model 2410, "Freon-22", Century motor 100 h.p., unused, crated. Sundfelt Equipment Company, 802 E. Anaheim St., Wilmington, Calif. Terminal 55684.

FOR SALE — AMMONIA EQUIPMENT
3—15 ton complete Frick ice making plants, new, in crates, no air system, sold as used.
2—10"x10" 4 cyl. Carbondale duplex DC to 225 h.p. 300 r.p.m.
1—9"x9" 4 cyl. York duplex DC to 150 h.p. motor, 300 r.p.m.
2—9"x9" 2 cyl. York DC to 75 h.p. motor.
1—10"x10" 2 cyl. York DC to 125 h.p. motor.
1—9"x9" 2 cyl. Frick compressor.
1—6½"x6½" 2 cyl. York compressor.
1—3"x3", 1—4"x4", 2—5"x5" condensing units.
3x3", 4x4", 5x5", 6x6" compressors.
11x22x51" 300 lb. ice cans, also 11x22x47" ice plants, 25 to 100 ton capacity, complete.
10 shell & tube condensers, 25 ton capacity.
1—300# Gifford Wood cubing machine.
ENTERPRISE EQUIPMENT CORPORATION
328 Bryant Ave. Bronx 59, N.Y.
Cable ENTREMA Phone DA 8-2121

Better Cold Insulation

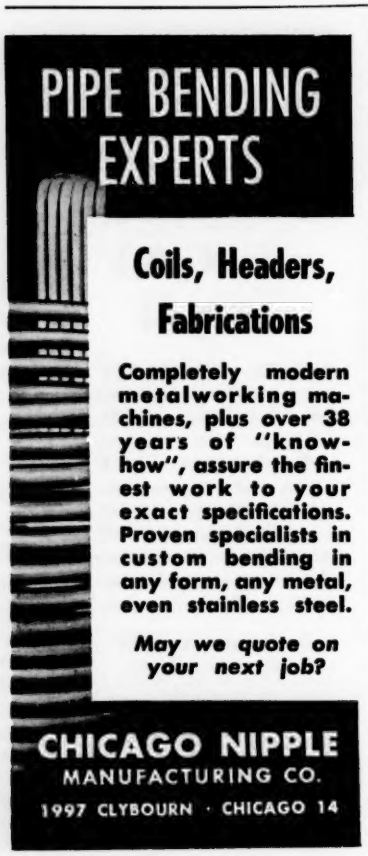
BETTER INSULATION than any materials at present available, the FINANCIAL TIMES, London, published in November, is a new compound. Tests which have been carried out with the material are said to have shown that it will enable liquid hydrogen to be stored for a year with less than ten percent loss. The material can be used at temperatures up to 1,000 F.

Material Shapes Easily

The new insulating material consists of from 40 to 80 layers of glass fibre paper on aluminum foil, each less than .001 mm. The material can be applied to contours of irregular shape, can be made and kept vacuum tight even when exposed to shock and vibration.

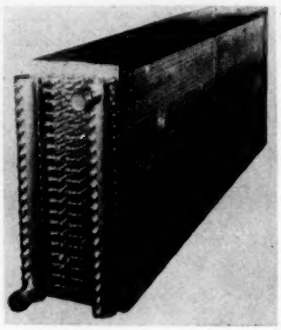
Spring Loaded Pulleys

FREQUENTLY overlooked is the motor pulley and base requirements of the smaller auxiliary around the large refrigerating plant. Introduced recently by a Chicago firm were two lines: spring loaded pulleys and adjustable motor bases for 1/3 to 1 hp. The firm features spring loaded pulleys for automatic equipment utilizing A-section belts, and adjustable motor bases for varying centers and variable speed drives.


PIPE BENDING
EXPERTS
Coils, Headers,
Fabrications
Completely modern metalworking machines, plus over 38 years of "know-how", assure the finest work to your exact specifications. Proven specialists in custom bending in any form, any metal, even stainless steel.
May we quote on your next job?
CHICAGO NIPPLE
MANUFACTURING CO.
1997 CLYBOURN · CHICAGO 14

Cleanable Water Coils

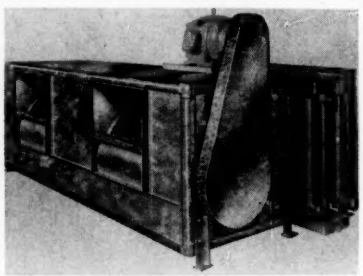
INTRODUCTION of a new line of cleanable water coils by a Zelienople, Pennsylvania firm was high-lighted by a major sale of these chilled water cooling coils to the General Services Administration of the U. S. Government.



Particularly suitable for central station or zone air conditioning use in many parts of the country, the cleanable advantages of these coils is obvious. Coils are made of seamless copper tubing 5/8-in o.d., spaced 1½-in on centers, with aluminum fins permanently bonded by mechanical expansion. Galvanized casings are furnished.

Air Handling Units

COMPACT, modular-design air-handling units for air conditioning were announced in October by Recold Corp. Described as AH, the units are rated from 800 to 3400 cfm for chilled water or direct expansion refrigerant. The units feature a blower section independent from the coil assembly; top, bottom, or rear fan discharge; various motor and coil locations; and any combination of coils and accessories.



Electric Defrost

Also in October, Recold Corp. announced that *Deltric* coils may now be used to minus 10F. This electric defrosting is specified, however, for use in low temperature situations where there are light moisture loads.

Designed for easy ceiling installation in either corner or backwall positions, only simple electrical connections are needed. *Deltric* obtains maximum efficiency by activation of a *Thermovane* door which closes during defrosting.

VOLUME

VOL. 137 JULY TO

A

Accident Prevents Another Sep-17
Advancing Technology Demands Manpower Upgrading
By W. R. Woolrich Nov-26
AFDOUS Code Dec-14
Airco Pacific Building Liquid Oxygen Plant Sep-13
Ammonia, Hazards Involving Aug-38
Artificial Ice For Canada's Sports
By George Legris Oct-12
Atlanta Gas Co. Meet Winter Peaks With Unique Storage and Refrigeration System Aug-15
Authors:
Bell, M. E. Jul-16
Dickinson, Thomas A. Jul-14; Oct-14; Dec-11
Halls, H. A. Sep-37
Hawkins, John A. Aug-10
Herr, Fred Nov-28
Kedenburg, Frank V. Jr. Aug-22
LeGris, George Oct-12
Slavin, Joseph W. Sep-18
Woolrich, W. R. Nov-26
Wright, H. A. Aug-28

B

Baltimore New Marsh Produce Service.. Sep-28
Beatrice Foods Corp. Detroit Refrigerating Div. Remodeling Sep-28
Book Reviews:
Chemistry Made Easy Dec-36
Engineering Data Book Oct-32
European Refrigeration Research and Its Applications Jul-30
Handling Perishable Agricultural Commodities Sep-27
Operating Data Book-NAPRE..... Sep-26
Standards on Water Cooling Towers.. Oct-32
Truck Trailer Refrigeration Equipment Oct-33
Breweries, Construction and Insulation Practices *By M. E. Bell* Jul-16

C

Canada's Winter Sport Relies on Artificial Ice *By George Legris* Oct-12
Chilled Gas, Who Needs..... Oct- 5
Cold Storage at Kaiserslautern, *By John A. Hawkins*..... Aug-10
Traps Solve Moisture Problems..... Sep-16
Colder Climate Building Problems *By M. E. Bell*..... Jul-16
Containerized Refrigerated Meat Delivery Oct-24
Controlled Atmosphere Refrigerated Storages
By Frank V. Kedenburg, Jr. Aug-22
Process and Storage Enhances Hay Vitamin Values Sep-37
Cryogenic Conference in California.... Sep-14
Curling *By George Legris*..... Oct-12

D

Dairy Assns. Promote Milk Products, Refrigeration Abroad Jul-24
Convention Set for Miami Beach.... Jul-24
Detroit Refrigerating Plant Remodeling Sep-28

E

Electrical Maintenance Control Devices
By H. A. Wright..... Aug-28
Equipment Data:
Air-to-Air Heat Pump..... July-38
Air Conditioning High Side Dec-6
Alco Develops 4-Way Valve..... Sept-6
Valve Controls Nov-10
Aluminum Cooling Tower Dec-6

INDEX

DECEMBER 1959

American-Standard Changes Jul-34
Ammonia Sales Appointments of Allied Chemical .Corp.....Nov-38; Dec-10
Appointments at National Bureau of Standards Nov-6
ARI Reports on Installed Central Station Systems Aug-9
Armour Regroups Chemicals... ..Aug-9
Armstrong Cork Adds to Intern ional Division Sep-10; Dec-10
Reorganizes Research Center.....Nov-37
Auto Refrigeration Sep-8
Ball Valve Plant Dec-9
Baltimore Air Coil Acquires Representation Jul-34
Officers Nov-6
Baumler, Karl, Manufacturing Manager at Pittsburgh Corning.....Sep-10
Bell is Managing Associated Refrigerating July-34
Booth Cold Storage Appointments....Jul-37
Btu Meter Accessory.....Jul-38
Bulk Milk Tank Coils.....Oct-9
Canadian Truck Body Co.....Nov-12
Capacity Control For Air Conditioners.Oct-9
Cellulose Acetate Filters.....Nov-12
Compact Air Drier.....Jul-38
Conditioned Apparel Aug-8
Creamery Package To Sell Cleaver Brooks Boilers Sep-9
Crystal Tips "Bits" Ice Maker.....Nov-11
Davison, R. O., Vice-President of Dairy Industries Supply Assn.....Jul-24
Dayton Rubber Coordinates Urethane Insulation Sales Sep-10
DeGraff, Dr. Herrell, New Member of TRRF Nov-4
Dial Thermometers Jul-39
Dow Reports on Tower Tests.....Sep-9
Drive-In Racks Oct-8
Dual Recording Thermometer.....Sep-6
Dunham Bush Appointments.Sep-10; Nov-38
DuPont Position for Dr. Frank E. French, Jr. Nov-6
Egg Storage Development Dec-8
Ehret-Baldwin-Hill Merge Organization.Sep-9
Electrical Developments Nov-11
Environmental Work Nov-38
Evaporate Condensers Jul-7
Filter Driers Nov-11
Flexible Steel Tubing.....Aug-7
Flooring Material Sep-7
Frick Directors Dec-9
German Cuber Oct-8
Halstead & Mitchell Vertical Line Added Nov-10
High Efficiency Foam.....Jul-7
Hueg, Herbert, Kohlenberger's Buyer..Aug-9
Hygrol Air Dehumidifier Sep-6
Ice Industry Changes Aug-9
Making Units Sep-6
Imeco Blast Chill Unit Sep-5
Indicating Dial Thermometer Aug-8
International A/C Capacity in Hermetic Centrifugals Jul-7
Isocyanate Products With Shelley Co. Nov-38
Kohlenberger Directors Named Jul-34
Packages Rocket Fuel Cooler Aug-7
Koiled Kords For Reefers Oct-8
Levin, Ralph, Mfg. Engr. Kohlenberger Sep-10
Light Weight Foam Insulates Freezer Clothes Aug-8
Truck Trailer Sep-6
Lithium Chloride Plant Nov-11
Load Limiting Relay For Compressor Motors Jul-38
Low Temp Liquid Pump Sep-6
Lusch Insulations Dec-10
Mechanically Refrigerated Cold Traps Sep-16
Michigan Harriss Pie Co. Joins Frozen Food Packers Jul-25
Moisture Liquid Indicator Jul-39
More On Block Ice Aug-39
Munchoof—Recolds Advertising & Sales Promotion Manager Aug-9
NAFFP Offices Move Jul-25
NARW Get News Billing Nov-4
Neoprene Coated Gloves Aug-8
New 95/5 Solder Sep-8
Noland Heads Dairy Manufacturers ..Jul-37
Older, Morris B., Controller at BAC ..Aug-9
Packaged Cooler Units For Vending Stations Jul-7
Pipe Locater Oct-8
Racks Dec-8
Plastic Insulations Nov-12
Pipe Aug-7
Plate Ice Maker Jul-7
Portable Grinders Sep-8
Welders Sep-8
Presstite-Keystone Engineering Produces New Name Nov-38
Quick Clamp Spray Nozzles Nov-11
Recold Appointments, Changes and Additions Jul-35; Nov-36
RefrigiWear Insulated Garments Aug-8
Renewal Parts Depots Nationwide For York Sep-9
Roller Bearings Aug-8
Ryan, Represents Jamison Door in Minneapolis Jul-37
Scott Foam Filter Nov-12
Sporlan Valve Increases Field Staff ..Sep-10
Sub-Zero Head Gear Aug-8
Tape Type Pipe Sealer Sep-8
Temperature Control Nov-11
Tennico Inc., New FES Representative Nov-38
Terminating Condensation Dec-8
Tesco Chemical Plant at Edward, Miss. Nov-38
Trailer Refrigeration System Sep-6
Transicold Expands Nov-37
Transport Refrigeration Dec-8
Ultra High Flow Pump Jul-39
Unsafe Work Garments Aug-8
Urethane Foam Insulated Trailer ..Nov-12
Vertical Flow Air Condensers Nov-10
Vilter Rotary Booster Compressor Series Aug-7; Dec-6
Visual Indicators Jul-38
Washable Urethane Filter Nov-12
Water-Cooled Electrolux Donated to Recold Museum Sep-9
Water Temperature Regulating Valves Nov-11
York Corp. Changes Jul-36

F—G

Farm Tank Standard Oct-19
Fiftieth Anniversary-NAPRE Nov-32
State Goes After Volume Refrigeration Oct-15
Fish Freezing *By Joseph W. Slavin* Sep-18
Fresh Water From Sea Water Aug-32
Frozen Food Code Approved By AFDOUS Aug-11
Handling Practices Dec-22
Prompts Interim Policy Suggestion ..Oct-22
Frozen Foods, Transit Temperatures Vital to, *By Scott Cassell* Aug-12

H

Hawaiian Cold Storage Expands Oct-15
Heat Pump, Air to Air Application at Springfield Public Building Commission Aug-24
Application Oct-18
Helium Liquefaction and Transportation Sep-12

I—J

Ice Chucking For Machine Work *By Thomas A. Dickinson* Oct-14
Test For English Plastic Missile Nov-17
Icebergs Furnish Fresh Water Aug-32
Icing Forums, NIA Convention Features Oct.-28
Icing Up *By Richard Francis* ..Oct-10; Nov-13
IIR Congress at Copenhagen Aug-19
Industrial Safety Nov-34
International Refrigeration Congress at Copenhagen Jul-8; Nov-19
Jet Refrigeration Simulates Icing Conditions Nov-17
Jordan Heads U.S. Delegation to IIR Congress Aug-19

K—L

Kaiserslautern Cold Storage, U.S. Army *By John A. Hawkins* Aug-10
Liquid Hydrogen Coming Space Propellant Nov-17

M—N

Meat Packers Decentralizing Aug-26
Methods and Equipment in Commercial Use of Fish Freezing *By Joseph W. Slavin* Sep-18
Milk Heats Water Oct-18
NAPRE's 50th Anniversary Dec-30
Nebraska-Iowa Beef Co. Aug-26
New Orleans Modern Food Distribution Warehouse Nov-30
NIA Convention Features Industrial Icing Forums Oct-28

O—P

On-Stream Pigs Prevent Pipeline Ice Jams Oct-5
Pappas Industries, Gets Rapid Ice Rights Jul-22
Perishable Transportation Aug-13
Plastic Missile Ice Test For Nov-17
Portable Vacuum Development *By Thomas A. Dickinson* Jul-14
Practical Electrical Maintenance Sure-Starts Those Auto-Systems *By H. A. Wright* Aug-28
Propane Refrigerates Propane For Utility Reserve Storage Aug-15
Protecting Frozen Foods Dec-18
Public Cold Storage Warehouse Refrigeration Plant Remodeling ...Sep-28

R

Railroads Study Combination Trains ..Aug-13
Rapid Ice Advantages Over Brine Tank Systems Jul-23
Reefer Piggy-Back for Beef Shipments, USDA Report Favors Aug-13
Refrigerant Handling and First Aid *By Fred Herr* Nov-28
Leak Routes Miamians Jul-13
Refrigerated Meat Delivery Containerized Oct-24
Storages-Controlled Atmosphere *By Frank V. Kedenburg, Jr.* Aug-22
Warehousing Seminar Oct-22
Refrigeration For Nuclear Ship Aug-32
For Quality Sausages *By Richard Francis* Jul-9
Improves Dry Milk Processing Jul-15
Regional Seminar, NARW in San Francisco Oct-22
Research Explosion Attributed to Nitrogen Sep-16
Rocky Mountain Meat Packing Plant ..Aug-26

S

Sicks Brewery Capilano Plant *By M. E. Bell* Jul-16
Solar Refrigeration Featured at N.Y.U. ..Jul-8
Sports Arenas Get Ready For Longer Season *By Richard Francis* Oct-10
Storage & Refrigeration System at Atlanta Gas Co. Aug-15

T

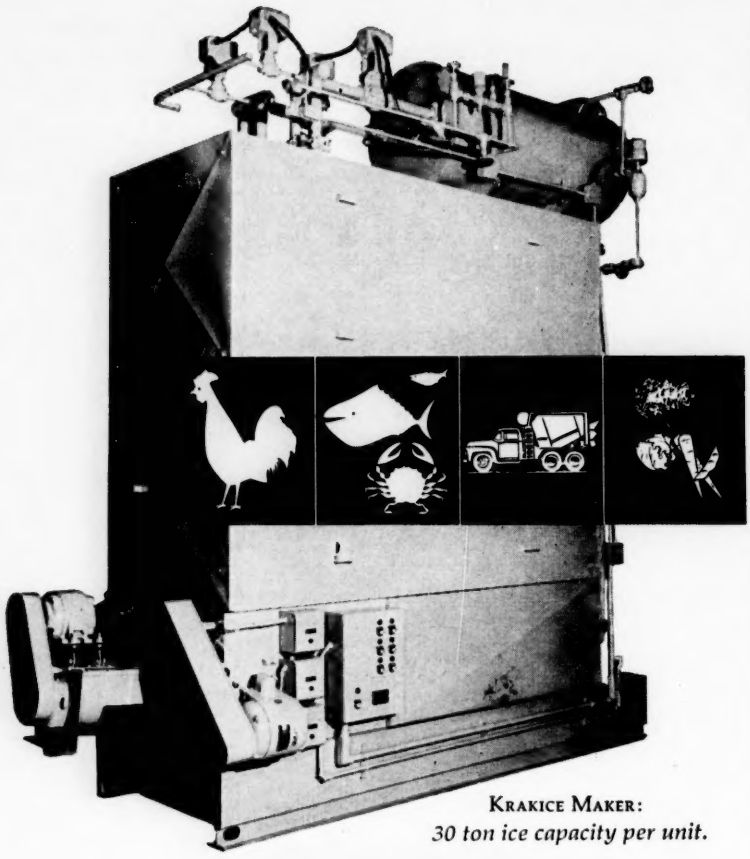
Technology Demands Manpower Upgrading *By W. R. Woolrich* Nov-26
Trailer Mobile Vacuum Units *By Thomas A. Dickinson* Jul-14
Transit Temperatures Vital to Frozen Food *By M. Scott Cassell* Aug-12
Transportation and Terminals Sep-11
Helium Sep-12
TRRF Executives Meet at Colorado Springs Aug-11
Reprints Available Dec-19

U

Underground Water Chillers Aug-24
U.S. Army Cold Storage at Kaiserslautern, Germany *By John A. Hawkins* Aug-10
Firm Gets Rapid-Ice Rights Jul-22
Usingers Celebrate 80th Year *By Richard Francis* Jul-9
Vacuum Precooler *By Thomas A. Dickinson* Dec-11

W—Z

Warehouse Features Unattended Plant .Dec-23
Zero or Below Dec-14



KRAKICE MAKER:
30 ton ice capacity per unit.

New Kohlenberger

KRAKICE MAKER

Solves Any Crushed Ice Requirement

Poultry, fish, concrete aggregate, vegetables ... Wherever crushed ice is used there's a place for Kohlenberger's new Krakice Maker. Now you can get higher ice yield per cubic ft. of space occupied. Kohlenberger's Krakice Maker delivers clearer crushed ice in larger quantities faster than conventional models. No fine adjustments are necessary and the need for knives or scrapers to remove ice from plates has been eliminated. Available in 15, 30, 45 and 60 ton units. Write for detailed information.

When quality and dependability count... contact Kohlenberger!

Kohlenberger services include:
Equipment Manufacture • Refrigeration System Design
Plant Layout • Field Erection

KOHLENBERGER ENGINEERING CORPORATION
DEPENDABLE REFRIGERATION SINCE 1922 — FULLERTON, CALIFORNIA

ENGINEERS
MANUFACTURERS
CONTRACTORS

1610 COMMONWEALTH AVENUE, FULLERTON, CALIFORNIA

ADVERTISERS

Allied Chemical Corp., General Chemical Div. 2
Armstrong Cork Co. 7

Ball Valve Co. 29
Brown Mfg. Co., Inc., K. G. 33
Butcher Boy Refrigerator Door Co. 1

Chicago Nipple Mfg. Co. 38
Classified Advertising 37
Conveyor Co., The 17

Dow Chemical Co., The .....4 and 5

Freezing Equipment Sales, Inc. .....Inside Back Cover

Jamison Cold Storage Door Co. .....Back Cover
Johns-Manville .....20 and 21

King Co. of Owatonna 27
King-Zeero Co. 25
Kohlenberger Engineering Corp. . 40

National Pipe Bending Co. 33
Niagara Blower Co. 35
Nickerson & Collins Co. 31

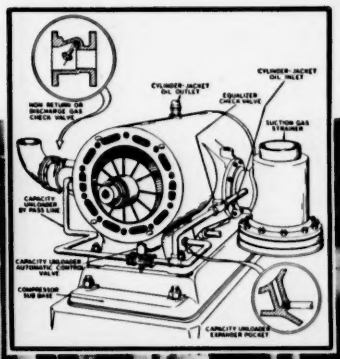
Phillips & Co., H. A. 19

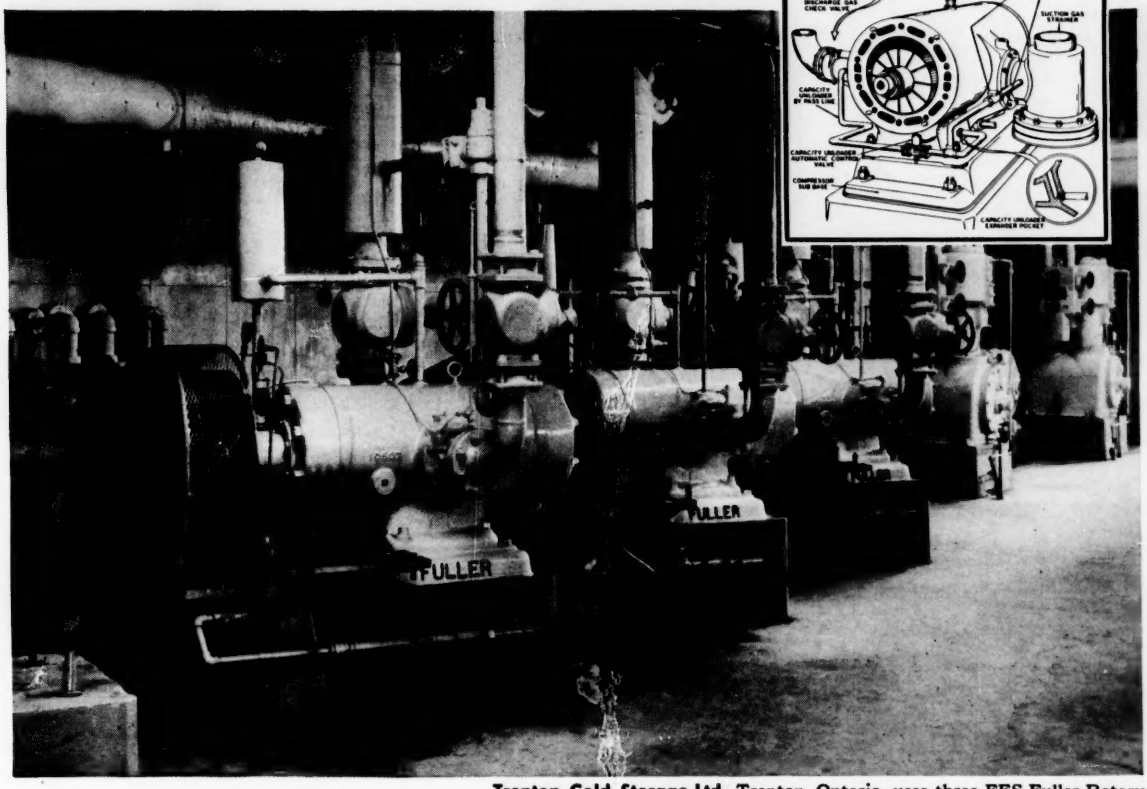
Recold Corp. 23

Shank Co., Cyrus 31
Sporlan Valve Co. .Inside Front Cover

Wanted and For Sale Advertising 37
Watkins Co., J. E. 34

More Proof of FES-FULLER *Superiority*





Trenton Cold Storage Ltd. Trenton, Ontario, uses three FES-Fuller Rotary Booster Compressors, rated at 244 tons, to maintain an even temperature of –40°F. *Installed by John Inglis Co., Limited, Toronto, Canada.*

TRENTON DROPS POWER COSTS 20% with New FES-FULLER booster installation!

Here's what Eben James, General Manager of Trenton Cold Storage, Ltd.—one of Canada's largest food freezers—says about their new FES-Fuller-designed refrigeration system:

"Our operating costs for power have dropped 20%, yet we've handled a greater volume this year than before. It has been a great satisfaction both to the operators and myself to see our plant run so smoothly."

And here's how this low-cost, efficient operation is safe-guarded by FES-Fuller Rotary Boosters:

1. **Absence of valves** and other reciprocating machinery permits continuous service for long periods, under heavy loads, without attention. Rotaries maintain full capacity for life of units.

2. **Patented jacket cooling** of FES Fuller Rotaries eliminates possibility of freezing causing damage to compressor.

3. **Vibration-free rotaries** are mounted on simple, low-cost foundations. Installation and maintenance savings are outstanding.

4. **Space-saving rotaries** mean uncluttered, efficient engine rooms. Trenton installation leaves adequate room for expansion despite ceiling height of less than 9 feet.

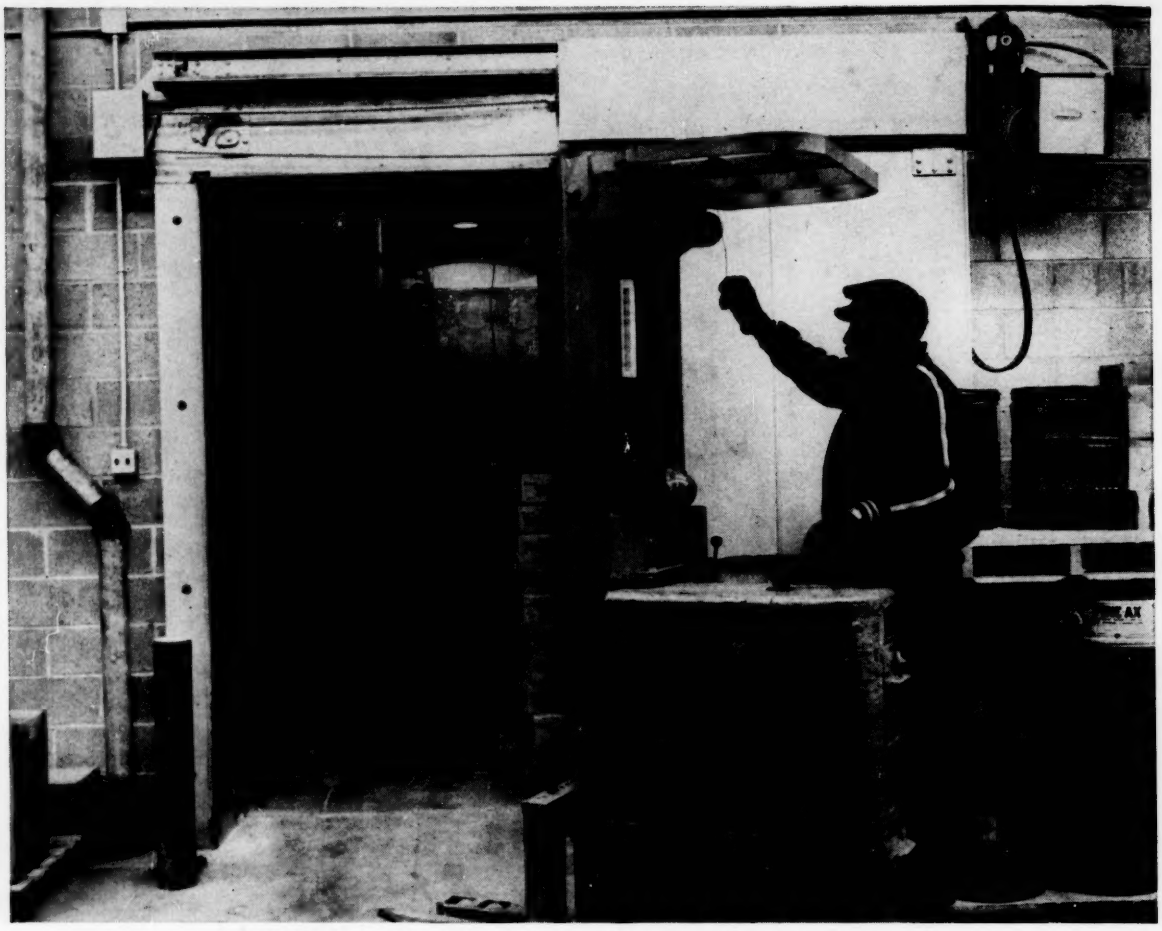
Freezing Equipment Sales engineers are always available for free consultation on the best ways to add to present freezer capacity, or to design new facilities. Write today for full literature on FES-Fuller Rotary Booster systems.

FES FULLER 4467 C-329

FREEZING EQUIPMENT SALES, INC., 1405 N. DUKE Street, YORK, PA.

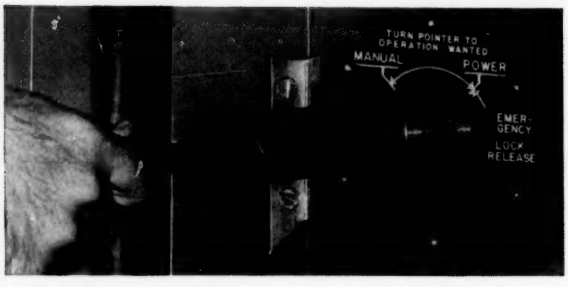
Qualified distributors in principal cities

LOW TEMPERATURE FREEZING EQUIPMENT



SAVE TIME—Counterbalanced door weight and level ride of door leaf permit rapid operation by remote pull switch without leaving truck.

Jamison Electroglide® Power Doors save time and refrigeration in new warehouse



EMERGENCY CONTROL ON BACK OF DOOR—Permits door to be opened manually in case of power failure. Provides safety release for padlocked door.

Photo courtesy P & C Food Markets, Inc., Syracuse, N. Y.

Modern cold storage warehouses geared for high volume power truck operation find the Jamison Electroglide Power Operated Door an answer to heavy traffic problems.

They meet almost every installation space requirement with left hand, right hand and bi-parting types. Exclusive Jamison operating features include important safety features—such as a full height, full travel safety edge—manual operation when power is off—inside safety release when padlocked outside.

Investigate Electroglide today. Write for latest bulletin to Jamison Cold Storage Door Co., Hagerstown, Md.

JAMISON

COLD STORAGE DOORS